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#### **08 DECEMBER 2025**

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**GS Paper 1: History,**

**TOPICS COVERED**

**08 December 2025**

**1.**

**Christmas back in Bethlehem after 2 years of Gaza war**  
**गाजा युद्ध के 2 साल बाद बेथलहम में क्रिसमस लौट आया**

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# Christmas back in Bethlehem after 2 years of Gaza war

**GS I: History**

**Associated Press**

**BETHLEHEM**

For the past two Christmases, John Juka's family restaurant looked about the same as any business in Bethlehem: shuttered and eerily empty. But on Saturday evening, it bustled with families and was



People gather at Nativity Square during a Christmas tree lighting ceremony in Bethlehem on Saturday. AFP  
Around 80% of the Muslim-majority city's residents live off it, according to the local government. Those earnings ripple out to communities across the West Bank, a territory long marked by economic precarity.

"When we have 10,000 visitors and pilgrims sleeping in Bethlehem, that means the butcher is working, the supermarket is working and everybody is working," said Bethlehem Mayor Maher Nicola Canawati. "There's a ripple effect."

This vanished when war broke out. A United Nations report said West Bank was going through its most severe economic downturn on record, citing the ongoing Israeli military operations.

Now Bethlehem residents seek a comeback. "The decision we took was to reignite the spirit of Christmas and reignite hope," the Mayor said. "This sends a great message to the world that we Palestinians love life and are eagerly looking forward to a peaceful solution."

- Around **80%** of the **Muslim-majority city's residents** live off it, according to the local government.  
स्थानीय सरकार के अनुसार, **मुस्लिम-बहुल शहर के लगभग 80% निवासी** इससे जीवन यापन करते हैं।
- Those earnings ripple out to communities across the **West Bank**, a territory long marked by **economic precarity**.  
ये आय **वेस्ट बैंक** के विभिन्न समुदायों तक फैलती है, जो लंबे समय से **आर्थिक अस्थिरता** से जूझ रहा क्षेत्र है।
- "When we have **10,000 visitors and pilgrims** sleeping in **Bethlehem**, that means the **butcher** is working, the **supermarket** is working and everybody is working," said **Bethlehem Mayor Maher Nicola Canawati**. "There's a ripple effect."  
"जब हमारे पास **10,000 आगंतुक और तीर्थयात्री** बेथलहम में सो रहे होते हैं, तो इसका मतलब है कि **कसाई** काम कर रहा है, **सुपरमार्केट** काम कर रहा है और सभी काम कर रहे हैं," कहा **बेथलहम के मेयर महेर निकोला कानावती** ने। "यह एक फैलाव प्रभाव है।"

## Christmas back in Bethlehem after 2 years of Gaza war

### गाजा युद्ध के 2 साल बाद बेथलहम में क्रिसमस लौट आया

• For the past two Christmases, **John Juka's family restaurant** looked about the same as any business in **Bethlehem**: shuttered and eerily empty.

पिछले दो क्रिसमस के लिए, **जॉन जूका के पारिवारिक रेस्तरां** बेथलहम में किसी भी व्यवसाय की तरह ही दिखाई देता था: बंद और अजीब तरह से खाली।

• But on **Saturday evening**, it bustled with **families** and was lit by strings of **red lights**, a hopeful change in the **Palestinian city** that's been reeling since war broke out in **Gaza**.

लेकिन **शनिवार की शाम** को यह **परिवारों** से भरा हुआ था और **लाल लाइटों** की डोरों से रोशन था, यह **फिलिस्तीनी शहर** में एक आशाजनक बदलाव था, जो **गाजा** में युद्ध के बाद से झेल रहा था।

• Christmas celebrations are slowly returning to the traditional birthplace of **Jesus** in the **Israeli-occupied West Bank**.

क्रिसमस उत्सव धीरे-धीरे **इसाई धर्म के संस्थापक यीशु** के पारंपरिक जन्मस्थान **इज़राइली-अधिग्रहीत वेस्ट बैंक** में लौट रहे हैं।

• While a shaky **ceasefire** holds in **Gaza**, **Palestinians** hope the festivities are a step toward a more peaceful future in a region shaken by **tragedy**.

जबकि **गाजा** में एक अस्थिर **आग रोक** लागू है, **फिलिस्तीनियों** को उम्मीद है कि उत्सव इस क्षेत्र में अधिक शांतिपूर्ण भविष्य की ओर एक कदम हैं, जिसे **त्रासदी** ने झकझोर दिया है।

• "It's not like it was before the war," 30-year-old **Mr. Juka** said. "But it's like life is coming back again."

"यह पहले जैसी स्थिति नहीं है," 30 वर्षीय **श्री जूका** ने कहा। "लेकिन ऐसा लगता है कि जीवन फिर से लौट रहा है।"

• **Tourism and religious pilgrims** have long been a prime economic engine for **Bethlehem**. **पर्यटन और धार्मिक तीर्थयात्रियों** ने लंबे समय से **बेथलहम** के लिए एक प्रमुख आर्थिक इंजन का काम किया है।



- This vanished when **war broke out**.  
यह तब समाप्त हो गया जब **युद्ध छिड़ गया**।
- A **United Nations report** said the West **Bank** was going through its most severe **economic downturn on record**, citing the ongoing **Israeli military operations**.  
एक **संयुक्त राष्ट्र रिपोर्ट** में कहा गया कि **वेस्ट बैंक** अपनी रिकॉर्ड की सबसे गंभीर **आर्थिक मंदी** से गुजर रहा था, जिसमें चल रही **इज़राइली सैन्य कार्रवाइयों** का हवाला दिया गया।
- Now **Bethlehem residents** seek a comeback.  
अब **बेथलहम के निवासी** वापसी की उम्मीद कर रहे हैं।
- "The decision we took was to reignite the **spirit of Christmas** and reignite **hope**," the **Mayor** said.  
"हमने जो निर्णय लिया वह था **क्रिसमस की भावना** को पुनर्जीवित करना और **आशा** को फिर से जगाना," **मेयर** ने कहा।
- "This sends a great message to the world that we **Palestinians** love life and are eagerly looking forward to a **peaceful solution**."  
"यह दुनिया को एक महान संदेश देता है कि हम **फिलिस्तीनी** जीवन से प्यार करते हैं और उत्सुकता से **शांतिपूर्ण समाधान** की प्रतीक्षा कर रहे हैं।"

**GS Paper II: Polity,**

**TOPICS COVERED**

**08 December**

1.	<b>The evolution of pension reforms in India</b> भारत में पेंशन सुधारों का विकास
2.	<b>What the Nithari acquittals reveal about the justice system</b> निठारी बरी होने के फैसले न्याय प्रणाली के बारे में क्या उजागर करते हैं



# The evolution of pension reforms in India

There has been a gradual but decisive shift from a welfare-based social assistance to a more participatory inclusion framework

GS II: Polity

DATA POINT

**Akshaya Ranganath**  
**Shreya Bhattacharya**

India's rapidly ageing population is emerging as a pivotal pension challenge. Today, over 153 million Indians are aged over 60. This is projected to double to 347 million by 2050. While a small section of older Indians has benefited from the rise of formal sector retirement, more than 88% of today's senior citizens continue to work, in the sprawling informal economy, without access to pensions or reliable social security rather than retiring (Chart 1). We revisit the evolution of pension schemes for financial inclusivity of the Indian informal sector.

The Indira Gandhi National Old Age Pension Scheme (IGNOAPS) is a social assistance programme launched in 1995 for persons aged over 65, living below the poverty line (BPL). Subsequent changes expanded scheme eligibility and strengthened financial support, leading to a significant rise in enrolment. It is a first among national-level efforts taken to provide a direct, regular source of income to the older population in the unorganised and economically vulnerable section of society. Similarly, formal sector government employees were covered under the government-sponsored Old Pension Scheme (OPS).

Research finds that unlike social benefit schemes, contributory pension schemes in developing countries encourage household formal savings behaviour. Announced in Budget 2015-16, the Atal Pension Yojana (APY) is a contributory pension scheme for individuals aged 18-40, where periodic contributions are made to a pension account. At retirement, the accumulated amount, including returns, is disbursed, with the government guaranteeing a minimum pension if returns fall short.

Taking into consideration the seasonal nature of informal sector income, especially agriculture, the APY allows for not just monthly but also quarterly and half-yearly instalments.

For the formal sector, OPS was replaced by the contributory-model New Pension Scheme (NPS) in 2004. The NPS also has a corporate sector model which extends to all corporate sector employees with a savings account. Recently, the NPS 2.0 was launched allowing total allotment to 100% equity and a flexible multiple scheme framework (MSF) – an attractive change for younger high-risk, high-reward-type investors. The APY and NPS models form a comprehensive long-term financial security framework that ensures inclusion in the formal financial system, despite the sectoral divide.

The Labour Codes introduced a uniform definition of 'wages', requiring that basic pay make up at least 50% of total earnings. This closes a long-standing loophole that allowed employers to shrink basic pay by inflating allowances. With pension, gratuity, and social security benefits now calculated on a higher base, workers stand to gain stronger financial protection.

The progression of pension schemes in India reflects a hierarchical pattern in which each stage builds on the needs identified before it. Through an equity and social-welfare lens, the government first introduced IGNOAPS and OPS to meet the basic needs of older adults. Having secured social protection, the focus shifted to more sophisticated goals such as financial inclusion and savings and investment behaviour through the NPS and the NPS 2.0. To bridge sectoral divide, similar behavioural nudges were extended to informal-sector workers via the APY.

Many of these schemes are explicitly targeted at BPL individuals, and are therefore designed to extend coverage to informal-sector workers who lack access to formal

retirement provisions. However, there still exists a gap in awareness of schemes amongst the eligible population. Our findings from the Longitudinal Ageing Survey of India (LASI) show that as of 2017-18, 42% of individuals aged over 55 were still unaware of NPS and its eligibility criteria and requirements (Chart 2).

To tackle limited awareness and fragmented access to welfare programs, the e-SHRAM portal was launched as a national database for informal sector workers. Through this, workers can register and obtain information about social security schemes for which they are eligible. Our analysis of the LASI data shows that over age 55, about 75.6% of women and 68% of men work in this sector.

While this is a significant step towards integrating the informal workforce into the country's formal social protection system, realising e-SHRAM's full potential depends on overcoming challenges related to registration, awareness, and effective disbursement of benefits. For instance, registration requires Aadhaar to phone number linkage and a savings bank account, which is susceptible to errors of exclusion. Moreover, according to the Comprehensive Annual Modular Survey of India (2022-23), 63% of the elderly population do not know how to use the Internet. This risks leaving the most economically vulnerable among them behind.

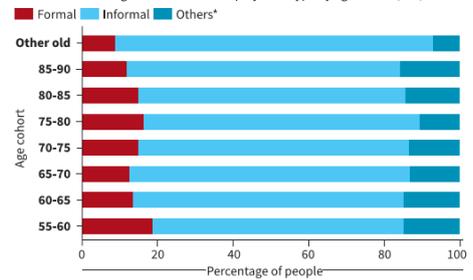
The evolution of pension schemes in India has seen a gradual but decisive shift from a welfare-based social assistance to a more participatory inclusion framework. While the challenges of unawareness still remain, initiatives such as e-SHRAM signal a data-driven approach to policy targeted at the older age population. The trajectory of these continuing revisions and initiatives will pave the way for inclusive policies and dignify the contributions of the elderly in their later years of life.

## Securing the future

The data for the charts were sourced from the Longitudinal Ageing Study in India (LASI), Wave 1 (2017-18)

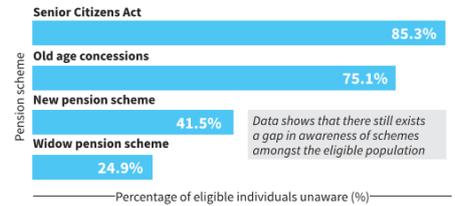


**CHART 1:** Percentage distribution of employment type by age cohort (55+)



\*Cases where available information was insufficient to determine the sector

**CHART 2:** Share of eligible individuals unaware of pension schemes (%)



Data shows that there still exists a gap in awareness of schemes amongst the eligible population

Akshaya Ranganath and Shreya Bhattacharya are with the Center for Advanced Financial Research and Learning (Reserve Bank of India)

## The evolution of pension reforms in India

### भारत में पेंशन सुधारों का विकास

- There has been a gradual but decisive shift from a welfare-based social assistance to a more participatory inclusion framework  
कल्याण-आधारित सामाजिक सहायता से एक अधिक सहभागी समावेशन ढाँचे की ओर एक क्रमिक लेकिन निर्णायक बदलाव हुआ है
- India's rapidly ageing population is emerging as a pivotal pension challenge.  
भारत की तेजी से वृद्ध होती जनसंख्या एक महत्वपूर्ण पेंशन चुनौती के रूप में उभर रही है।
- Today, over 153 million Indians are aged over 60.  
वर्तमान में 153 करोड़ से अधिक भारतीयों की आयु 60 वर्ष से अधिक है।
- This is projected to double to 347 million by 2050.  
यह संख्या 2050 तक बढ़कर 347 करोड़ होने का अनुमान है।
- While a small section of older Indians has benefited from the rise of formal sector retirement, more than 88% of today's senior citizens continue to work, in the sprawling informal economy, without access to pensions or reliable social security rather than retiring (Chart 1).  
औपचारिक क्षेत्र से सेवानिवृत्ति लाभ पाने वाले बुजुर्गों की संख्या कम है, जबकि 88% से अधिक बुजुर्ग आज भी अनौपचारिक अर्थव्यवस्था में बिना पेंशन और बिना विश्वसनीय सामाजिक सुरक्षा के कार्य करने पर विवश हैं।



- We revisit the evolution of pension schemes for financial inclusivity of the Indian informal sector.  
हम भारत के **अनौपचारिक क्षेत्र** की वित्तीय समावेशन हेतु पेंशन योजनाओं के विकास को पुनः देखते हैं।
- The Indira Gandhi National Old Age Pension Scheme (IGNOAPS) is a social assistance programme launched in 1995 for persons aged over 65, living below the poverty line (BPL).  
**इंदिरा गांधी राष्ट्रीय वृद्धावस्था पेंशन योजना**, वर्ष **1995**, गरीबी रेखा से नीचे रहने वाले **65 वर्ष** से अधिक आयु के व्यक्तियों के लिए एक सामाजिक सहायता कार्यक्रम है।
- Subsequent changes expanded scheme eligibility and strengthened financial support, leading to a significant rise in enrolment.  
बाद के परिवर्तनों ने योजना की पात्रता बढ़ाई और **वित्तीय सहायता** को मजबूत किया, जिससे पंजीकरण में उल्लेखनीय वृद्धि हुई।
- It is a first among national-level efforts taken to provide a direct, regular source of income to the older population in the unorganised and economically vulnerable section of society.  
यह देश के **असंगठित** तथा **आर्थिक रूप से कमजोर** बुजुर्गों को नियमित आय उपलब्ध कराने का पहला राष्ट्रीय प्रयास था।
- Similarly, formal sector government employees were covered under the government-sponsored Old Pension Scheme (OPS).  
इसी प्रकार, औपचारिक क्षेत्र के कर्मचारियों को **पुरानी पेंशन योजना** के अंतर्गत शामिल किया गया।
- Research finds that unlike social benefit schemes, contributory pension schemes in developing countries encourage household formal savings behaviour.  
अध्ययन बताते हैं कि **अंशदायी पेंशन योजनाएँ** परिवारों में औपचारिक बचत को बढ़ावा देती हैं, जबकि केवल सामाजिक लाभ योजनाएँ ऐसा नहीं कर पातीं।
- Announced in Budget 2015-16, the Atal Pension Yojana (APY) is a contributory pension scheme for individuals aged 18-40, where periodic contributions are made to a pension account.  
**2015-16 बजट** में घोषित **अटल पेंशन योजना** एक अंशदायी पेंशन योजना है, जिसमें **18 से 40 वर्ष** आयु के लोग नियमित अंशदान करते हैं।
- At retirement, the accumulated amount, including returns, is disbursed, with the government guaranteeing a minimum pension if returns fall short.  
सेवानिवृत्ति पर संचित राशि तथा प्रतिफल लौटाए जाते हैं तथा सरकार **न्यूनतम पेंशन** की गारंटी देती है।
- Taking into consideration the seasonal nature of informal sector income, especially agriculture, the APY allows for not just monthly but also quarterly and half-yearly instalments.  
अनौपचारिक क्षेत्र, विशेषकर कृषि, की **मौसमी आय** को देखते हुए योजना में मासिक के साथ-साथ **त्रैमासिक** और **अर्धवार्षिक** किश्तों की सुविधा है।
- For the formal sector, OPS was replaced by the contributory-model New Pension Scheme (NPS) in 2004.  
औपचारिक क्षेत्र में **2004** में पुरानी पेंशन योजना के स्थान पर **नई पेंशन योजना** लागू की गई।
- The NPS also has a corporate sector model which extends to all corporate sector employees with a savings account.  
इस योजना का **कॉर्पोरेट मॉडल** भी है, जो सभी कॉर्पोरेट कर्मचारियों को बचत खाते के साथ प्रदान किया जाता है।
- Recently, the NPS 2.0 was launched allowing total allotment to 100% equity and a flexible multiple scheme framework (MSF) — an attractive change for younger high-risk, high-reward-type investors.  
हाल ही में **एनपीएस 2.0** शुरू किया गया है, जिसमें **100% इक्विटी** तक निवेश की अनुमति और **लचीला बहु-योजना ढांचा** उपलब्ध है।
- The APY and NPS models form a comprehensive long-term financial security framework that ensures inclusion in the formal financial system, despite the sectoral divide.  
एपीवाई और एनपीएस मिलकर दीर्घकालिक **वित्तीय सुरक्षा ढांचा** तैयार करते हैं जो औपचारिक वित्तीय प्रणाली में समावेशन सुनिश्चित करता है।
- The Labour Codes introduced a uniform definition of 'wages', requiring that basic pay make up at least 50% of total earnings.  
**श्रम संहिताओं** ने **वेतन** की एकरूप परिभाषा दी, जिसके अनुसार मूल वेतन कुल आय का **50%** होना आवश्यक है।



- This closes a long-standing loophole that allowed employers to shrink basic pay by inflating allowances.  
इससे नियोक्ताओं द्वारा भत्ते बढ़ाकर मूल वेतन घटाने की पुरानी खामी समाप्त हुई।
- With pension, gratuity, and social security benefits now calculated on a higher base, workers stand to gain stronger financial protection.  
अब पेंशन, अनुग्रह राशि, और सामाजिक सुरक्षा लाभ उच्च आधार पर गणना होने से श्रमिकों को अधिक वित्तीय सुरक्षा मिलेगी।
- The progression of pension schemes in India reflects a hierarchical pattern in which each stage builds on the needs identified before it.  
भारत की पेंशन योजनाओं का विकास एक क्रमबद्ध पैटर्न दर्शाता है, जिसमें प्रत्येक चरण पूर्व आवश्यकताओं पर आधारित है।
- Through an equity and social-welfare lens, the government first introduced IGNOAPS and OPS to meet the basic needs of older adults.  
समानता और सामाजिक कल्याण की दृष्टि से सरकार ने पहले वृद्धावस्था पेंशन और पुरानी पेंशन योजना शुरू की।
- Having secured social protection, the focus shifted to more sophisticated goals such as financial inclusion and savings and investment behaviour through the NPS and the NPS 2.0.  
सामाजिक सुरक्षा स्थापित होने के बाद लक्ष्य वित्तीय समावेशन और बचत-निवेश व्यवहार को बढ़ावा देने की ओर स्थानांतरित हुआ।
- To bridge sectoral divide, similar behavioural nudges were extended to informal-sector workers via the APY.  
क्षेत्रीय असमानता को कम करने के लिए ऐसे ही प्रोत्साहन अनौपचारिक क्षेत्र में अटल पेंशन योजना द्वारा दिए गए।

## Pension Awareness and Inclusion in India भारत में पेंशन जागरूकता और समावेशन

- Many of these schemes are explicitly targeted at **BPL individuals**, and are therefore designed to extend coverage to informal-sector workers who lack access to formal retirement provisions.  
इनमें से कई योजनाएँ स्पष्ट रूप से बीपीएल व्यक्तियों को लक्षित करती हैं, और इसलिए इन्हें उन अनौपचारिक क्षेत्र के श्रमिकों तक कवरेज बढ़ाने के लिए बनाया गया है जिनके पास औपचारिक सेवानिवृत्ति प्रावधानों की पहुँच नहीं है।
- However, there still exists a gap in awareness of schemes amongst the eligible population.  
हालाँकि, पात्र जनसंख्या में योजनाओं के प्रति जागरूकता में अभी भी एक अंतर मौजूद है।
- Our findings from the **Longitudinal Ageing Survey of India (LASI)** show that as of **2017-18**, **42%** of individuals aged over 55 were still unaware of **NPS** and its eligibility criteria and requirements (Chart 2).  
हमारे निष्कर्ष, जो **लॉन्गिट्यूडिनल एजिंग सर्वे ऑफ इंडिया** से प्राप्त हुए हैं, बताते हैं कि **2017-18** तक **55 वर्ष** से अधिक आयु के **42%** व्यक्ति **एनपीएस** और इसके पात्रता मानदंडों तथा आवश्यकताओं से अब भी अनभिज्ञ थे।
- To tackle limited awareness and fragmented access to welfare programs, the **e-SHRAM portal** was launched as a national database for informal sector workers.  
सीमित जागरूकता और कल्याणकारी कार्यक्रमों तक खंडित पहुँच से निपटने के लिए **ई-श्रम पोर्टल** को अनौपचारिक क्षेत्र के श्रमिकों के लिए एक राष्ट्रीय डेटाबेस के रूप में शुरू किया गया।
- Through this, workers can register and obtain information about social security schemes for which they are eligible.  
इसके माध्यम से श्रमिक पंजीकरण कर सकते हैं और उन सामाजिक सुरक्षा योजनाओं की जानकारी प्राप्त कर सकते हैं जिनके लिए वे पात्र हैं।
- Our analysis of the LASI data shows that over age 55, about **75.6% of women** and **68% of men** work in this sector.  
हमारे विश्लेषण से पता चलता है कि **55 वर्ष** से अधिक आयु में लगभग **75.6% महिलाएँ** और **68% पुरुष** इस क्षेत्र में कार्य करते हैं।
- While this is a significant step towards integrating the informal workforce into the country's formal social protection system, realising e-SHRAM's full potential depends on overcoming



challenges related to registration, awareness, and effective disbursement of benefits.

यह अनौपचारिक श्रमबल को देश की औपचारिक सामाजिक सुरक्षा प्रणाली में शामिल करने की दिशा में एक महत्वपूर्ण कदम है, लेकिन ई-श्रम की पूर्ण क्षमता तभी पूरी हो सकती है जब पंजीकरण, जागरूकता और लाभों के प्रभावी वितरण से जुड़ी चुनौतियों को पार किया जाए।

- For instance, registration requires Aadhaar to phone number linkage and a savings bank account, which is susceptible to **errors of exclusion**.  
उदाहरण के लिए, पंजीकरण के लिए आधार को फोन नंबर से जोड़ना और एक बचत बैंक खाता आवश्यक है, जो **बहिष्करण संबंधी त्रुटियों** के प्रति संवेदनशील है।
- Moreover, according to the **Comprehensive Annual Modular Survey of India (2022-23)**, **63%** of the elderly population do not know how to use the Internet.  
इसके अतिरिक्त, **समग्र वार्षिक मॉड्यूलर सर्वे ऑफ इंडिया (2022-23)** के अनुसार, **63%** वृद्ध जनसंख्या को इंटरनेट का उपयोग करना नहीं आता।
- This risks leaving the most economically vulnerable among them behind.  
इससे यह जोखिम उत्पन्न हो जाता है कि उनमें से सबसे अधिक आर्थिक रूप से कमजोर लोग पीछे छूट सकते हैं।
- The evolution of pension schemes in India has seen a gradual but decisive shift from a welfare-based social assistance to a more participatory inclusion framework.  
भारत में पेंशन योजनाओं के विकास में कल्याण-आधारित सामाजिक सहायता से एक अधिक सहभागी समावेशन ढाँचे की ओर धीरे-धीरे लेकिन निर्णायक परिवर्तन देखा गया है।
- While the challenges of unawareness still remain, initiatives such as e-SHRAM signal a **data-driven** approach to policy targeted at the older age population.  
हालाँकि अनभिज्ञता की चुनौतियाँ अब भी बनी हुई हैं, लेकिन **ई-श्रम** जैसी पहले वृद्ध जनसंख्या को लक्षित नीतियों के लिए एक **डेटा-आधारित दृष्टिकोण** का संकेत देती हैं।
- The trajectory of these continuing revisions and initiatives will pave the way for inclusive policies and dignify the contributions of the elderly in their later years of life.  
इन निरंतर संशोधनों और पहलों की दिशा आगे चलकर समावेशी नीतियों का मार्ग प्रशस्त करेगी और वृद्धजन के जीवन के अंतिम वर्षों में उनके योगदान को सम्मान प्रदान करेगी।

## What the Nithari acquittals reveal about the justice system

GS II: Polity

The Nithari acquittals reveal a system that meets procedure, but misses justice

G. S. Bajpai

On November 12, Surinder Koli was acquitted by the Supreme Court in the last of the 16 cases linked to the 2006 Nithari killings. On December 29, 2006, skeletal remains of several children were discovered from a drain behind the house of a businessman, Mohinder Singh Pandher, at Nithari in Noida. The silence following his release suggests a deep unease: not because guilt was disproved with precision, but because the evidence was tainted or insufficiently collected.

### Double injustice

The problem becomes even more glaring when we recall that Mohinder Singh Pandher, the owner of the house where several of the offences allegedly took place, had already been acquitted years ago after spending 14 years in custody as an undertrial. When both accused in a

case of such gravity are set free because the investigation could not withstand legal scrutiny, it is not a clean acquittal. It is a failed prosecution. This is a double injustice – towards the accused and towards the victims.

Wrongful prosecution in Nithari amounts to secondary victimisation of the accused. Koli spent 19 years in jail; Pandher spent 14. These are years erased from their lives. India still lacks a statutory framework to compensate individuals who suffer incarceration and stigma due to investigative failures. Once labelled a serial killer or rapist, acquittal rarely restores one's honour. Such cases are not isolated. Under stringent special laws like the Unlawful Activities (Prevention) Act (UAPA), where bail becomes nearly impossible, undertrials have spent a decade or more in jail only to be acquitted later on technical grounds. The Law Commission of India's 277th Report recommended a

compensation scheme for those wrongly prosecuted. Yet, the proposal continues to languish without implementation.

The other side of the injustice is even more troubling – the absolute denial of justice to victims. The Nithari families deserved the truth, accountability, and closure. What they received instead was silence. The fact that no direction has been issued for a fresh or independent investigation reflects a disturbing complacency: once the accused walk free, the system believes its job is done.

Consider the parallels. Anokhillal, convicted for rape of a minor, was acquitted after spending 11 years in prison when the DNA protocol used in his case was found flawed. The acquittal was hailed as a victory for procedural correctness, but no one asked the fundamental question: if not him, who committed the assault? Our system's disproportionate focus on the accused should not blind us to the equally

compelling need to discover the actual perpetrator. Justice must strike a balance.

### THE GIST

#### Lack of accountability

Underlying this failure is the absence of accountability. Investigators, forensic experts, and prosecution officers can make grave errors – losing evidence, relying on unscientific methods, building fragile cases – without facing repercussions. There is also a lack of a transparent, data-driven model to evaluate performance in policing, prosecution, and forensic services. Critical statistics on conviction quality, investigative timelines, and decision patterns are either absent or inaccessible. Without data, we cannot diagnose; without accountability, we cannot reform.

The Nithari acquittals reveal a justice system that completes cases, but does not necessarily deliver justice. In the eyes of the law, both accused now walk free. But the children who were killed still have no voice. A nation that prides itself on constitutionalism cannot accept justice that merely rearranges guilt without identifying truth. India deserves a criminal justice system where truth, accountability, and victims' rights are not afterthoughts. Justice must not only acquit the innocent – it must pursue the guilty with equal resolve.

The author is Vice Chancellor & Sr.Professor of Criminology, National Law University Delhi. Views are personal.

On December 29, 2006, skeletal remains of several children were discovered from a drain behind the house of a businessman, Mohinder Singh Pandher, at Nithari in Noida.

Investigators, forensic experts, and prosecution officers can make grave errors – losing evidence, relying on unscientific methods, building fragile cases – without facing repercussions.

The Nithari families deserved the truth, accountability, and closure. What they received instead was silence.

**What the Nithari acquittals reveal about the justice system**  
**निठारी बरी होने के फैसले न्याय प्रणाली के बारे में क्या उजागर करते हैं**  
**Nithari case and failures in justice system**  
**निठारी मामला और न्याय प्रणाली की विफलताएँ**



- On **November 12**, Surinder Koli was acquitted by the Supreme Court in the last of the **16 cases** linked to the **2006 Nithari killings**.  
बारह नवम्बर को सुरेन्द्र कोली को सर्वोच्च न्यायालय द्वारा दो हजार छह निठारी हत्याओं से जुड़े **सोलह मामलों** में अंतिम मामले में बरी कर दिया गया।
- On **December 29, 2006**, skeletal remains of several children were discovered from a drain behind the house of a businessman, **Mohinder Singh Pandher**, at Nithari in Noida.  
उनतीस दिसम्बर दो हजार छह को नोएडा के निठारी में व्यापारी **मोहिन्दर सिंह पन्धेर** के घर के पीछे नाली से कई बच्चों के कंकाल अवशेष बरामद किए गए।
- The silence following his release suggests a deep unease: not because guilt was disproved with precision, but because the evidence was tainted or insufficiently collected.  
उनकी रिहाई के बाद की चुप्पी एक गहरी असहजता को दर्शाती है, कारण यह नहीं कि दोष पूर्ण रूप से असिद्ध हुआ बल्कि इसलिए कि प्रमाण दूषित या अपर्याप्त रूप से एकत्र किए गए थे।

## Double injustice द्वि-अन्याय

- The problem becomes even more glaring when we recall that **Mohinder Singh Pandher**, the owner of the house where several of the offences allegedly took place, had already been acquitted years ago after spending **14 years** in custody as an undertrial.  
समस्या और स्पष्ट हो जाती है जब स्मरण करते हैं कि **मोहिन्दर सिंह पन्धेर**, जिनके घर में कथित रूप से कई अपराध हुए, उन्हें विचाराधीन अवस्था में **चौदह वर्ष** जेल में रहने के बाद वर्षों पहले ही बरी कर दिया गया था।
- When both accused in a case of such gravity are set free because the investigation could not withstand legal scrutiny, it is not a clean acquittal. It is a failed prosecution.  
जब इतने गंभीर मामले में दोनों आरोपित इसलिए बरी हो जाएँ क्योंकि जाँच न्यायिक जांच की कसौटी पर खड़ी नहीं हो सकी, तो यह स्वच्छ बरी नहीं बल्कि अभियोजन की विफलता है।
- This is a double injustice — towards the accused and towards the victims.  
यह दोहरा अन्याय है — आरोपितों के प्रति भी और पीड़ितों के प्रति भी।
- Wrongful prosecution in Nithari amounts to secondary victimisation of the accused.  
निठारी में गलत अभियोजन आरोपितों के द्वितीयक पीड़ितकरण के समान है।
- Koli spent **19 years** in jail; Pandher spent **14**.  
कोली ने **उन्नीस वर्ष** जेल में बिताए; पन्धेर ने **चौदह** वर्ष बिताए।
- These are years erased from their lives.  
ये वर्ष उनके जीवन से मिट चुके हैं।
- India still lacks a statutory framework to compensate individuals who suffer incarceration and stigma due to investigative failures.  
भारत में अब भी ऐसा वैधानिक ढाँचा नहीं है जो जाँच विफलताओं के कारण कारावास और कलंक झेलने वाले व्यक्तियों को प्रतिपूर्ति दे सके।
- Once labelled a serial killer or rapist, acquittal rarely restores one's honour.  
एक बार किसी को श्रेणीबद्ध हत्यारा या बलात्कारी कह दिया जाए तो बरी होने के बाद भी सम्मान शायद ही लौटता है।
- Such cases are not isolated.  
ऐसे मामले अकेले नहीं हैं।
- Under stringent special laws like the **Unlawful Activities (Prevention) Act (UAPA)**, where bail becomes nearly impossible, undertrials have spent a decade or more in jail only to be acquitted later on technical grounds.  
**यूपीए** जैसे कठोर विशेष क़ानूनों में, जहाँ जमानत लगभग असंभव हो जाती है, विचाराधीन कैदियों ने एक दशक या उससे अधिक जेल में बिताए और बाद में तकनीकी आधार पर बरी हो गए।
- The Law Commission of India's **277th Report** recommended a compensation scheme for those wrongly prosecuted.  
भारत के विधि आयोग की **दो सौ सतहत्तरवीं रिपोर्ट** ने गलत अभियोजन झेलने वालों के लिए प्रतिपूर्ति योजना की अनुशंसा की थी।
- Yet, the proposal continues to languish without implementation.  
फिर भी यह प्रस्ताव बिना क्रियान्वयन के लंबित पड़ा है।



- The other side of the injustice is even more troubling — the absolute denial of justice to victims.  
अन्याय का दूसरा पक्ष और भी कष्टप्रद है — पीड़ितों को न्याय का पूर्ण अभाव।
- The Nithari families deserved the truth, accountability, and closure.  
निठारी परिवार सत्य, उत्तरदायित्व और समापन के हकदार थे।
- What they received instead was silence.  
इसके स्थान पर उन्हें केवल चुप्पी मिली।
- The fact that no direction has been issued for a fresh or independent investigation reflects a disturbing complacency: once the accused walk free, the system believes its job is done.  
यह तथ्य कि नई या स्वतंत्र जाँच का कोई निर्देश नहीं दिया गया, चिंताजनक आत्मसंतोष को दर्शाता है: जैसे ही आरोपित मुक्त हुए, व्यवस्था मान लेती है कि उसका कार्य पूर्ण हो गया।
- Consider the parallels.  
समान उदाहरणों पर विचार कीजिए।
- Anokhilal, convicted for rape of a minor, was acquitted after spending **11 years** in prison when the DNA protocol used in his case was found flawed.  
अनोखिलाल, जिसे एक नाबालिग से दुष्कर्म के लिए दोषसिद्ध किया गया था, अपने मामले में उपयोग किए गए डीएनए प्रोटोकॉल में त्रुटि पाए जाने पर **ग्यारह वर्ष** जेल में बिताने के बाद बरी हुआ।
- The acquittal was hailed as a victory for procedural correctness, but no one asked the fundamental question: if not him, who committed the assault?  
यह बरी होना प्रक्रिया-सही होने की जीत कहा गया, पर किसी ने मूल प्रश्न नहीं पूछा: यदि वह नहीं, तो फिर अपराध किसने किया?
- Our system's disproportionate focus on the accused should not blind us to the equally compelling need to discover the actual perpetrator.  
हमारी व्यवस्था का अत्यधिक ध्यान आरोपित पर केंद्रित होना वास्तविक अपराधी की खोज की उतनी ही आवश्यक आवश्यकता को अनदेखा नहीं करना चाहिए।
- Justice must strike a balance.  
न्याय को संतुलन स्थापित करना चाहिए।

### Lack of accountability उत्तरदायित्व का अभाव

- Underlying this failure is the absence of accountability.  
इस विफलता के मूल में उत्तरदायित्व का अभाव है।
- Investigators, forensic experts, and prosecution officers can make grave errors — losing evidence, relying on unscientific methods, building fragile cases — without facing repercussions.  
जाँचकर्ता, फॉरेंसिक विशेषज्ञ और अभियोजन अधिकारी गंभीर त्रुटियाँ कर सकते हैं — प्रमाण खो देना, अवैज्ञानिक तरीकों पर निर्भर रहना, कमजोर मामले बनाना — और उन्हें इसके परिणाम भी नहीं भुगतने पड़ते।
- There is also a lack of a transparent, data-driven model to evaluate performance in policing, prosecution, and forensic services.  
पुलिसिंग, अभियोजन और फॉरेंसिक सेवाओं के प्रदर्शन के मूल्यांकन हेतु पारदर्शी, आँकड़ा-आधारित मॉडल का भी अभाव है।
- Critical statistics on conviction quality, investigative timelines, and decision patterns are either absent or inaccessible.  
दोषसिद्धि की गुणवत्ता, जाँच की समय-सीमा और निर्णय पैटर्न से जुड़े महत्वपूर्ण आँकड़े या तो उपलब्ध नहीं या सुलभ नहीं हैं।
- Without data, we cannot diagnose; without accountability, we cannot reform.  
आँकड़ों के बिना हम समस्या का निदान नहीं कर सकते; उत्तरदायित्व के बिना सुधार संभव नहीं है।
- The Nithari acquittals reveal a justice system that completes cases, but does not necessarily deliver justice.  
निठारी में हुई बरियताएँ एक ऐसी न्याय प्रणाली को उजागर करती हैं जो मामले तो समाप्त कर देती है पर न्याय अनिवार्य रूप से प्रदान नहीं करती।
- In the eyes of the law, both accused now walk free.  
कानून की दृष्टि में अब दोनों आरोपित मुक्त हैं।



**TELEGRAM CHANNEL:** <https://t.me/patrioticIAS>

**YOUTUBE CHANNEL:** <https://www.youtube.com/@PatrioticIAS>

**CONTACT: 9971932488**



- But the children who were killed still have no voice.  
परन्तु जिन बच्चों की हत्या हुई, उनकी आवाज़ अब भी निर्बल है।
- A nation that prides itself on constitutionalism cannot accept justice that merely rearranges guilt without identifying truth.  
जो राष्ट्र संवैधानिकता पर गर्व करता है, वह ऐसा न्याय स्वीकार नहीं कर सकता जो सत्य की पहचान किए बिना केवल दोष का पुनःविन्यास कर दे।
- India deserves a criminal justice system where **truth, accountability, and victims' rights** are not afterthoughts.  
भारत ऐसी दंड न्याय प्रणाली का अधिकारी है जहाँ **सत्य, उत्तरदायित्व और पीड़ितों के अधिकार** बाद में सोचने योग्य बातें न हों।
- Justice must not only acquit the innocent — it must pursue the guilty with equal resolve.  
न्याय को केवल निर्दोष को बरी ही नहीं करना चाहिए — उसे दोषियों का भी समान दृढ़ता से अनुसरण करना चाहिए।

## GS Paper II: Governance

### TOPICS COVERED

08 December

1.	<b>DMK MP Wilson seeks centres for SWAYAM examination in T.N.</b> <b>डीएमके सांसद विल्सन टी.एन. में SWAYAM परीक्षा केंद्रों की मांग करते हैं</b>
2.	<b>Surveillance apps in welfare, snake oil for accountability</b> <b>कल्याण योजनाओं में सर्विलांस ऐप्स, जवाबदेही के लिए झूठा उपाय</b>



## DMK MP Wilson seeks centres for SWAYAM examination in T.N.

GS II: Government Scheme

THE  
CHENNAI

DMK Rajya Sabha member P. Wilson has urged Union Education Minister Dharmendra Pradhan to allocate examination centres in Tamil Nadu for B.Ed. students from the State. They are due to appear for the SWAYAM July semester examinations on December 15 and 16.

In his letter, he highlighted that many candidates from Tamil Nadu, including 50 students from Thanjavur district, had been allotted examination centres in Karnataka and

Kerala. "The act of the National Testing Agency, which conducts the examination, is arbitrary, unjustifiable, and severely detrimental to the academic interests of students. Tamil Nadu has a robust network of teacher education institutions, and thousands of B.Ed. students rely on SWAYAM examinations to obtain their course completion certificates from their universities," he said.

He said students, particularly those from poor backgrounds, could not afford the travel and accommodation required to attend exams in other States.

### DMK MP Wilson seeks centres for SWAYAM examination in T.N. डीएमके सांसद विल्सन टी.एन. में SWAYAM परीक्षा केंद्रों की मांग करते हैं

- DMK Rajya Sabha member **P. Wilson** has urged Union Education Minister **Dharmendra Pradhan** to allocate examination centres in **Tamil Nadu** for **B.Ed. students** from the State. डीएमके राज्यसभा सदस्य **पी. विल्सन** ने केंद्रीय शिक्षा मंत्री **धर्मेंद्र प्रधान** से **तमिलनाडु** के **बी.एड. छात्रों** के लिए परीक्षा केंद्र आवंटित करने का आग्रह किया है।
- They are due to appear for the **SWAYAM July semester examinations** on **December 15 and 16**. वे **15 और 16 दिसंबर** को होने वाली **SWAYAM जुलाई सेमेस्टर परीक्षा** में उपस्थित होने वाले हैं।
- In his letter, he highlighted that many candidates from **Tamil Nadu**, including **50 students from Thanjavur district**, had been allotted examination centres in **Karnataka and Kerala**. अपने पत्र में उन्होंने बताया कि **तमिलनाडु** के कई उम्मीदवारों, जिनमें **थंजावुर जिले के 50 छात्र** शामिल हैं, को **कर्नाटक और केरल** में परीक्षा केंद्र आवंटित किए गए हैं।
- "The act of the **National Testing Agency**, which conducts the examination, is arbitrary, unjustifiable, and severely detrimental to the academic interests of students. "परीक्षा आयोजित करने वाली **नेशनल टेस्टिंग एजेंसी** की यह कार्रवाई मनमानी, अनुचित और छात्रों के शैक्षणिक हितों के लिए गंभीर रूप से हानिकारक है।
- **Tamil Nadu** has a robust network of teacher education institutions, and thousands of **B.Ed. students** rely on **SWAYAM examinations** to obtain their course completion certificates from their universities," he said. उन्होंने कहा कि **तमिलनाडु** में शिक्षक शिक्षा संस्थानों का एक मजबूत नेटवर्क है, और हजारों **बी.एड. छात्र** अपने विश्वविद्यालयों से पाठ्यक्रम पूरा करने के प्रमाणपत्र प्राप्त करने के लिए **SWAYAM परीक्षाओं** पर निर्भर हैं।
- He said students, particularly those from **poor backgrounds**, could not afford the travel and accommodation required to attend exams in other States.



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उन्होंने कहा कि छात्र, विशेष रूप से गरीब पृष्ठभूमि वाले छात्र, अन्य राज्यों में परीक्षा देने के लिए आवश्यक यात्रा और आवास का खर्च वहन नहीं कर सकते।

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## Surveillance apps in welfare, snake oil for accountability

GS II: Governance

MGB

It is increasingly common to see cleaning staff photographing or filming themselves at work. This is meant to ensure that they do their job. How effective it is, is anybody's guess.

The lack of accountability of government employees manifests itself in many ways in India – they may be absent from work, may come late or leave early, may not work in a time-bound manner, and may expect bribes.

### The biometric era

Somewhere along the line, digital tools emerged as the magic wand for this vexatious problem. For instance, years ago, some governments in India introduced biometric attendance to ensure punctuality. In some cases, if biometric attendance was not marked on time, employees were threatened with punitive action. At that time, in Khunti Block (Jharkhand), some conscientious officials worked after office hours to complete online tasks that required connectivity ("digital paperwork") because Internet bandwidth improved in the evenings. With the system of clocking in and out, their emphasis shifted from getting the work done to marking biometric attendance in a timely manner. In Rajasthan, a Randomized Controlled Trial (RCT) that studied the impact of biometric attendance on absenteeism among government nurses found that, in the long run, it resulted in lower attendance.

Take another example. In the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), official worker attendance is widely inflated to siphon off wages. Wage expenditure is booked on the basis of fudged attendance and either shared with participating "workers" (job cards holders who do not actually work) or pocketed entirely by the masterminds.

In response, the government introduced the National Mobile Monitoring System (NMMS) app in 2022. The NMMS app requires a photograph of workers at the worksite to be uploaded twice a day. It was meant to put an end to fudged attendance records. The app might succeed in forcing worker presence at the NREGA worksite, but it cannot guarantee that they do any useful work once they are there. In the most egregious cases workers were not even showing up twice a day to mark attendance: the masterminds were uploading random photographs. They worked out that the NMMS app only needs a jpeg file: irrelevant photographs and photographs of photographs can do the trick.

A July 2025 circular of the Union Ministry of Rural Development (MoRD) lists seven such malpractices. Fudged photographs replaced fudged signatures to inflate attendance and the racket continued, more or less as before.



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Tech-fixes and apps cannot foster a responsible work environment that motivates workers to act in public interest

Around the same time, the Ministry of Women and Child Development (MoWCD) made "Facial Recognition Technology" (FRT) compulsory for Take Home Rations (THR). The reasoning is familiar: THR packets for children and pregnant and lactating mothers do not reach them. Making it mandatory to upload the mother's photograph (with blinking) on the Poshan Tracker is supposed to ensure that she does not get cheated. The Poshan Tracker ostensibly does a real-time match of the live photograph with an on-record photograph.

An Anganwadi worker in Nuh (Haryana) who was struggling with connectivity, a crowd and the clunky app, said matter-of-factly, "those who want to cheat will continue", i.e., nothing prevents an Anganwadi worker from refusing THR packets to mothers after they have jumped through the hoops of Poshan Tracker's FRT.

This loophole was documented in 2017 when the Aadhaar-Based Biometric Authentication (ABBA) was made mandatory for Public Distribution System (PDS) rations. It was the same logic again: ABBA would ensure that only person A could receive their benefits. This meant that the elderly and persons with disabilities who would request neighbours or relatives to pick up their rations, could no longer do so. Person A (sick, old, or immobile) would have to show up in person. Many began to be excluded as a result.

Subsequently, some States put an 'override' mechanism in place, at least on paper. Meanwhile, PDS ration dealers would make people authenticate – biometrically – for their full quota of rations, while giving them a bit less (in 2017, in Jharkhand, an accepted norm was 4.5 kilograms instead of 5 kg). ABBA resulted in "pain without gain".

### Limited effect

In many States across India, a number of tasks done by Auxiliary Nurses and Midwives (ANMs) require geo-tagging or photographic evidence. For instance, uploading photos of a breastfeeding mother as proof that the ANM had done breastfeeding counselling. This results in a perverse situation: uploading a photo without counselling would not get her into trouble, but counselling without the photo upload would. In a tribal area of Andhra Pradesh, another ANM said that she was compelled to move around for connectivity in order to log a home visit on the app. She looked visibly hurt as she showed us a "show cause notice" she got soon after: as she had moved more than 300 metres to log the home visit and the app red-flagged her visit as fraudulent. Such surveillance apps, in accountability clothing, demotivate sincere workers.

At best, such apps can have a limited impact

on accountability. But accountability itself is a limited achievement.

Jean Drèze and Amartya Sen (2025) urge us to go beyond accountability (which "can induce people to do what someone else wants them to do") towards responsibility (as it "includes what people themselves want to do in the public interest").

The tech-fixes described above cannot foster responsible behaviour, and cannot help self-motivate workers to act in public interest. The current obsessive fixation with tech-fixes diverts attention from the larger goal of improving work culture and changing social norms. It blinds us to other pathways to get there. For instance, few ask how is it that even in areas with poor accountability, so many nurses, teachers, doctors and cleaners work diligently?

### A case of agnotology

Returning to accountability in welfare programmes, the government is consciously ignoring the failures of tech-fixes. For instance, even though the MoRD officially acknowledged that the NMMS was being "misused and manipulated", in July, the MoWCD made FRT compulsory for THRs in July. Moreover, having admitted to the failure of NMMS, the MoRD responded by ordering "100% verification of all uploaded photographs" each day in all gram panchayats.

There is a carefully cultivated ignorance towards new problems created by apps: exclusion (in the PDS, of the elderly, and the immobile for whom ABBA fails; in NREGA, of workers whose photographs could not be uploaded on NMMS), inefficiency (distribution of PDS rations and THR packets takes much longer), new forms of corruption (claiming ABBA failures even when it is successful), privacy invasions (uploading photographs of breastfeeding mothers), identity fraud, and worker demotivation.

The stubborn refusal to learn is baffling. It raises questions about the possible capture of decision-making by vested interests to create assured markets for their products. The infrastructure for surveillance apps (devices including smartphones for all frontline workers, electronic point of sale machines, hard drives, servers, Internet data, authentication services) is not cheap. Tech companies are doing today what the tobacco and refined white sugar industry did in the past – cultivate ignorance about the harms from their products to stall corrective action. The government is playing along.

Science historian Robert Proctor uses the term agnotology, how and why various forms of knowledge have "not come to be", for this phenomenon. Put simply, tech-fixes are snake oil for accountability in welfare.

## Surveillance apps in welfare, snake oil for accountability कल्याण योजनाओं में सर्विलांस ऐप्स, जवाबदेही के लिए झूठा उपाय

- It is increasingly common to see cleaning staff photographing or filming themselves at work. अब यह आम होता जा रहा है कि सफाई कर्मचारी अपने काम के दौरान अपनी **photographing** या **filming** करते हुए दिखाई देते हैं।
- This is meant to ensure that they do their job. यह इसलिए किया जाता है ताकि सुनिश्चित किया जा सके कि वे अपना काम ठीक से कर रहे हैं।
- How effective it is, is anybody's guess. यह कितना **effective** है, यह कोई नहीं कह सकता।
- The lack of accountability of government employees manifests itself in many ways in India — they may be absent from work, may come late or leave early, may not work in a time-bound manner, and may expect bribes. भारत में सरकारी कर्मचारियों की **accountability** की कमी कई तरीकों से दिखती है — वे काम से अनुपस्थित हो सकते हैं, देर से आ सकते हैं या जल्दी जा सकते हैं, समयबद्ध तरीके से काम नहीं कर सकते, और **bribes** की अपेक्षा कर सकते हैं।



## The biometric era

### बायोमेट्रिक युग

- Somewhere along the line, digital tools emerged as the magic wand for this vexatious problem.  
किसी बिंदु पर, इस कठिन समस्या के लिए डिजिटल उपकरण एक **magic wand** के रूप में उभरने लगे।
- For instance, years ago, some governments in India introduced biometric attendance to ensure punctuality.  
उदाहरण के लिए, वर्षों पहले भारत में कुछ सरकारों ने **biometric attendance** शुरू किया ताकि **punctuality** सुनिश्चित की जा सके।
- In some cases, if biometric attendance was not marked on time, employees were threatened with punitive action.  
कई मामलों में, यदि समय पर बायोमेट्रिक उपस्थिति नहीं लगाई गई, तो कर्मचारियों को **punitive action** की धमकी दी जाती थी।
- At that time, in Khunti Block (Jharkhand), some conscientious officials worked after office hours to complete online tasks that required connectivity (“digital paperwork”) because Internet bandwidth improved in the evenings.  
उस समय, **Khunti Block (Jharkhand)** में कुछ ईमानदार अधिकारी कार्यालय समय के बाद काम करते थे ताकि वे “digital paperwork” पूरा कर सकें क्योंकि शाम के समय इंटरनेट **bandwidth** बेहतर हो जाती थी।
- With the system of clocking in and out, their emphasis shifted from getting the work done to marking biometric attendance in a timely manner.  
Clocking in और out की प्रणाली के साथ, उनका ध्यान काम पूरा करने से हटकर समय पर **biometric attendance** लगाने पर चला गया।
- In Rajasthan, a Randomized Controlled Trial (**RCT**) that studied the impact of biometric attendance on absenteeism among government nurses found that, in the long run, it resulted in lower attendance.  
राजस्थान में, एक **RCT** जिसने सरकारी नर्सों में बायोमेट्रिक उपस्थिति के absenteeism पर प्रभाव का अध्ययन किया, पाया कि लंबी अवधि में इससे उपस्थिति **कम** हो गई।
- Take another example.  
एक और उदाहरण लें।
- In the Mahatma Gandhi National Rural Employment Guarantee Act (**MGNREGA**), official worker attendance is widely inflated to siphon off wages.  
**MGNREGA** में, आधिकारिक कार्यकर्ता उपस्थिति को बड़े पैमाने पर बढ़ाकर दिखाया जाता है ताकि **wages siphon off** किए जा सकें।
- Wage expenditure is booked on the basis of fudged attendance and either shared with participating “workers” (job cards holders who do not actually work) or pocketed entirely by the masterminds.  
वेतन व्यय **fudged attendance** के आधार पर दिखाया जाता है और इसे “workers” (जो वास्तव में काम नहीं करते) के साथ साझा किया जाता है या पूरी तरह से **masterminds** द्वारा रखा जाता है।
- In response, the government introduced the National Mobile Monitoring System (**NMMS**) app in 2022.  
इसके जवाब में, सरकार ने 2022 में **NMMS app** शुरू किया।
- The NMMS app requires a photograph of workers at the worksite to be uploaded twice a day.  
NMMS ऐप में कार्यस्थल पर मजदूरों की **दो बार** फोटो अपलोड करनी होती है।
- It was meant to put an end to fudged attendance records.  
इसका उद्देश्य **fudged attendance** को समाप्त करना था।
- The app might succeed in forcing worker presence at the NREGA worksite, but it cannot guarantee that they do any useful work once they are there.  
ऐप मजदूरों की उपस्थिति सुनिश्चित कर सकता है, लेकिन यह गारंटी नहीं दे सकता कि वे कोई **useful work** करेंगे।
- In the most egregious cases workers were not even showing up twice a day to mark attendance: the masterminds were uploading random photographs.  
सबसे गंभीर मामलों में मजदूर उपस्थिति दर्ज कराने के लिए दोनों बार नहीं आते थे: **masterminds** रैंडम फोटो अपलोड कर देते थे।



- They worked out that the NMMS app only needs a **jpeg file**: irrelevant photographs and photographs of photographs can do the trick.  
उन्होंने पता लगाया कि NMMS ऐप को केवल एक **jpeg file** चाहिए: अप्रासंगिक फोटो या फोटो की फोटो भी काम कर जाती है।
- A July **2025** circular of the Union Ministry of Rural Development (**MoRD**) lists seven such malpractices.  
केंद्रीय **MoRD** के **जुलाई 2025** के सर्कुलर में ऐसी सात गलत प्रथाएँ सूचीबद्ध हैं।
- Fudged photographs replaced fudged signatures to inflate attendance and the racket continued, more or less as before.  
**Fudged photographs** ने **fudged signatures** की जगह ले ली और उपस्थिति बढ़ाने का यह खेल पहले की तरह चलता रहा।
- Around the same time, the Ministry of Women and Child Development (**MoWCD**) made “Facial Recognition Technology” (**FRT**) compulsory for Take Home Rations (**THR**).  
उसी समय, **MoWCD** ने **THR** के लिए “**FRT**” अनिवार्य कर दिया।
- The reasoning is familiar: **THR** packets for children and pregnant and lactating mothers do not reach them.  
तर्क परिचित है: बच्चों और गर्भवती तथा स्तनपान कराने वाली माताओं के लिए **THR packets** उन तक नहीं पहुँचते।
- Making it mandatory to upload the mother’s photograph (with blinking) on the Poshan Tracker is supposed to ensure that she does not get cheated.  
**Poshan Tracker** पर माँ की ब्लिंकिंग वाली फोटो अपलोड करना अनिवार्य करने का उद्देश्य यह सुनिश्चित करना है कि उसे धोखा न दिया जाए।
- The Poshan Tracker ostensibly does a real-time match of the live photograph with an on-record photograph.  
Poshan Tracker कथित रूप से लाइव फोटो का **real-time match** रिकॉर्डेड फोटो से करता है।
- An Anganwadi worker in Nuh (Haryana) who was struggling with connectivity, a crowd and the clunky app, said matter-of-factly, “those who want to cheat will continue”, i.e., nothing prevents an Anganwadi worker from refusing **THR** packets to mothers after they have jumped through the hoops of Poshan Tracker’s **FRT**.  
**नूह (हरियाणा)** की एक आंगनवाड़ी कार्यकर्ता, जो connectivity, भीड़ और clunky ऐप से जूझ रही थी, ने स्पष्ट कहा: “जो cheat करना चाहते हैं, करते रहेंगे”, यानी Poshan Tracker की **FRT** प्रक्रिया पूरी होने के बाद भी आंगनवाड़ी कार्यकर्ता **THR packets** देने से इनकार कर सकती है।
- This loophole was documented in **2017** when the Aadhaar-Based Biometric Authentication (**ABBA**) was made mandatory for Public Distribution System (**PDS**) rations.  
यह loophole **2017** में दर्ज किया गया था, जब **ABBA** को **PDS** राशन के लिए अनिवार्य किया गया।
- It was the same logic again: **ABBA** would ensure that only person A could receive their benefits.  
तर्क वही था: **ABBA** सुनिश्चित करेगा कि केवल **person A** ही अपना लाभ प्राप्त कर सके।
- This meant that the elderly and persons with disabilities who would request neighbours or relatives to pick up their rations, could no longer do so.  
इसका अर्थ था कि बुजुर्ग और दिव्यांग व्यक्ति, जो अपने पड़ोसियों या परिजनों से राशन लाने का अनुरोध करते थे, अब ऐसा नहीं कर सकते थे।
- Person A (sick, old, or immobile) would have to show up in person.  
**Person A** (बीमार, बुजुर्ग या चलने-फिरने में असमर्थ) को स्वयं उपस्थित होना पड़ता था।
- Many began to be excluded as a result.  
इसके परिणामस्वरूप कई लोग **excluded** होने लगे।
- Subsequently, some States put an ‘override’ mechanism in place, at least on paper.  
बाद में कुछ राज्यों ने ‘**override**’ तंत्र लागू किया, कम से कम कागज़ों में।
- Meanwhile, **PDS** ration dealers would make people authenticate — biometrically — for their full quota of rations, while giving them a bit less (in **2017**, in Jharkhand, an accepted norm was **4.5 kg** instead of **5 kg**).  
इस बीच, **PDS dealers** लोगों से उनका पूरा quota **biometric authentication** के साथ ले लेते थे, लेकिन उन्हें उससे कम राशन देते थे (जैसे **2017** में झारखंड में **5 kg** की जगह **4.5 kg** देना सामान्य था)।
- **ABBA** resulted in “pain without gain”.  
**ABBA** ने “**pain without gain**” उत्पन्न किया



## Limited effect सीमित प्रभाव

- In many States across India, a number of tasks done by Auxiliary Nurses and Midwives (ANMs) require geo-tagging or photographic evidence.  
भारत के कई राज्यों में Auxiliary Nurses and Midwives (ANMs) द्वारा किए जाने वाले कई कार्यों के लिए **geo-tagging** या **photographic evidence** की आवश्यकता होती है।
- For instance, uploading photos of a breastfeeding mother as proof that the ANM had done breastfeeding counselling.  
उदाहरण के लिए, स्तनपान कराती हुई माँ की फोटो अपलोड करना, यह प्रमाण देने के लिए कि ANM ने **breastfeeding counselling** किया है।
- This results in a perverse situation: uploading a photo without counselling would not get her into trouble, but counselling without the photo upload would.  
इससे एक विकृत स्थिति पैदा होती है: बिना counselling फोटो अपलोड कर देना उसे परेशानी में नहीं डालेगा, लेकिन counselling करके भी फोटो अपलोड न करना उसे परेशानी में डाल देगा।
- In a tribal area of Andhra Pradesh, another ANM said that she was compelled to move around for connectivity in order to log a home visit on the app.  
**आंध्र प्रदेश** के एक जनजातीय क्षेत्र में, एक अन्य ANM ने कहा कि ऐप पर home visit लॉग करने के लिए उसे **connectivity** के लिए इधर-उधर घूमना पड़ा।
- She looked visibly hurt as she showed us a “show cause notice” she got soon after: as she had moved more than **300 metres** to log the home visit and the app red-flagged her visit as fraudulent.  
वह स्पष्ट रूप से आहत दिखी जब उसने “show cause notice” दिखाया: क्योंकि वह home visit लॉग करने के लिए **300 metres** से अधिक चली गई थी, और ऐप ने उसकी विज़िट को fraudulent के रूप में **red-flag** कर दिया।
- Such surveillance apps, in accountability clothing, demotivate sincere workers.  
ऐसे **surveillance apps**, जो accountability का मुखौटा पहनते हैं, ईमानदार कार्यकर्ताओं को **demotivate** करते हैं।
- At best, such apps can have a limited impact on accountability.  
अधिकतम, ऐसे ऐप्स का accountability पर **limited impact** ही हो सकता है।
- But accountability itself is a limited achievement.  
लेकिन accountability स्वयं एक **limited achievement** है।
- Jean Drèze and Amartya Sen (2025) urge us to go beyond accountability (which “can induce people to do what someone else wants them to do”) towards responsibility (as it “includes what people themselves want to do in the public interest”).  
**Jean Drèze और Amartya Sen (2025)** आग्रह करते हैं कि accountability (जो “लोगों से वह करवाती है जो कोई और चाहता है”) से आगे बढ़कर **responsibility** की ओर जाना चाहिए (जो “वह शामिल करती है जो लोग स्वयं **public interest** में करना चाहते हैं”)।
- The tech-fixes described above cannot foster responsible behaviour, and cannot help self-motivate workers to act in public interest.  
ऊपर वर्णित **tech-fixes** जिम्मेदार व्यवहार विकसित नहीं कर सकते, और न ही workers को **public interest** में कार्य करने हेतु self-motivate कर सकते हैं।
- The current obsessive fixation with tech-fixes diverts attention from the larger goal of improving work culture and changing social norms.  
वर्तमान में tech-fixes के प्रति **obsessive fixation** कामकाज की संस्कृति और सामाजिक मानदंडों में सुधार के बड़े लक्ष्य से ध्यान भटका देती है।
- It blinds us to other pathways to get there.  
यह हमें अन्य रास्तों को देखने से रोक देती है।
- For instance, few ask how is it that even in areas with poor accountability, so many nurses, teachers, doctors and cleaners work diligently?  
उदाहरण के लिए, बहुत कम लोग पूछते हैं कि accountability कम होने वाले क्षेत्रों में भी इतने **nurses, teachers, doctors और cleaners** परिश्रमपूर्वक कैसे काम करते हैं?

## A case of agnotology

### अज्ञान-विज्ञान (Agnotology) का मामला



- Returning to accountability in welfare programmes, the government is consciously ignoring the failures of tech-fixes.  
वेलफेयर कार्यक्रमों में accountability की ओर लौटते हुए, सरकार जानबूझकर **tech-fixes** की विफलताओं को नजरअंदाज कर रही है।
- For instance, even though the MoRD officially acknowledged that the NMMS was being “misused and manipulated”, in July, the MoWCD made **FRT** compulsory for **THR**s in July.  
उदाहरण के लिए, भले ही **MoRD** ने आधिकारिक रूप से स्वीकार किया कि **NMMS** का “misused and manipulated” किया जा रहा था, लेकिन **जुलाई** में **MWCD** ने **THR**s के लिए **FRT** अनिवार्य कर दिया।
- Moreover, having admitted to the failure of NMMS, the MoRD responded by ordering “100% verification of all uploaded photographs” each day in all gram panchayats.  
इसके अलावा, NMMS की विफलता स्वीकार करने के बाद, **MoRD** ने सभी ग्राम पंचायतों में प्रतिदिन “**100% verification of all uploaded photographs**” का आदेश जारी किया।
- There is a carefully cultivated ignorance towards new problems created by apps: exclusion (in the PDS, of the elderly, and the immobile for whom ABBA fails; in NREGA, of workers whose photographs could not be uploaded on NMMS), inefficiency (distribution of PDS rations and THR packets takes much longer), new forms of corruption (claiming ABBA failures even when it is successful), privacy invasions (uploading photographs of breastfeeding mothers), identity fraud, and worker demotivation.  
ऐप्स द्वारा उत्पन्न नई समस्याओं की ओर एक **carefully cultivated ignorance** है: exclusion (PDS में बुजुर्ग और immobile व्यक्ति जहाँ **ABBA** विफल होता है; NREGA में वे worker जिनकी फोटो **NMMS** पर अपलोड नहीं हो सकी), inefficiency (PDS राशन और THR पैकेट का वितरण अधिक समय लेता है), नए रूप की **corruption** (**ABBA** सफल होने पर भी विफलता बताना), **privacy invasion** (breastfeeding mothers की फोटो अपलोड करना), identity fraud, और worker demotivation।
- The stubborn refusal to learn is baffling.  
सीखने से जिद्दी इनकार **baffling** है।
- It raises questions about the possible capture of decision-making by vested interests to create assured markets for their products.  
यह प्रश्न उठाता है कि कहीं निर्णय-प्रक्रिया पर **vested interests** का कब्जा तो नहीं, जो अपने उत्पादों के लिए **assured markets** बनाना चाहते हैं।
- The infrastructure for surveillance apps (devices including smartphones for all frontline workers, electronic point of sale machines, hard drives, servers, Internet data, authentication services) is not cheap.  
**Surveillance apps** के लिए आवश्यक अवसंरचना (smartphones, **e-POS machines**, hard drives, servers, इंटरनेट डेटा, authentication services) सस्ती नहीं है।
- Tech companies are doing today what the tobacco and refined white sugar industry did in the past — cultivate ignorance about the harms from their products to stall corrective action.  
**Tech companies** वही कर रही हैं जो अतीत में **tobacco** और **refined white sugar** उद्योग ने किया— अपने उत्पादों के नुकसान के बारे में अज्ञानता को बढ़ावा देना ताकि सुधारात्मक कार्रवाई को रोका जा सके।
- The government is playing along.  
सरकार इसमें साथ दे रही है।
- Science historian Robert Proctor uses the term agnotology, how and why various forms of knowledge have “not come to be”, for this phenomenon.  
विज्ञान इतिहासकार **Robert Proctor** इस घटना के लिए **agnotology** शब्द का उपयोग करते हैं, यह बताने के लिए कि कैसे और क्यों विभिन्न प्रकार के ज्ञान “उत्पन्न नहीं हो पाए”।
- Put simply, tech-fixes are snake oil for accountability in welfare.  
सरल शब्दों में, **tech-fixes** वेलफेयर में accountability के लिए “**snake oil**” हैं।



## GS Paper II: International Relations

**TOPICS COVERED**

**08 December**

1.

**Attempted coup in Benin 'foiled' by govt. forces, says Interior Minister**  
बेनिन में प्रयासित तख्तापलट को सरकार ने नाकाम किया, आंतरिक मंत्री का बयान

### Attempted coup in Benin 'foiled' by govt. forces, says Interior Minister



REUTERS

#### GS II: IR: Africa

Benin's government on Sunday said that it had thwarted an attempted coup, after a group of soldiers announced on state television that they had ousted President Patrice Talon. Interior Minister Alassane Seidou said that the Beninese Armed Forces maintained control of the situation and foiled the attempt. AFP

कर दिया।

### **Attempted coup in Benin 'foiled' by govt. forces, says Interior Minister**

**बेनिन में प्रयासित तख्तापलट को सरकार ने नाकाम किया, आंतरिक मंत्री का बयान**

- Benin's **government** on **Sunday** said that it had thwarted an attempted **coup**, after a group of **soldiers** announced on **state television** that they had ousted **President Patrice Talon**.

बेनिन की सरकार ने रविवार को कहा कि उसने एक प्रयासित तख्तापलट को नाकाम कर दिया, जब एक समूह के सैनिकों ने राज्य टेलीविजन पर घोषणा की कि उन्होंने राष्ट्रपति पैट्रिक टैलॉन को हटाया है।

- Interior Minister Alassane Seidou** said that the **Beninese Armed Forces** maintained control of the situation and foiled the attempt.

आंतरिक मंत्री अलास्साने सैडू ने कहा कि बेनिन सशस्त्र बलों ने स्थिति पर नियंत्रण बनाए रखा और प्रयास को नाकाम

## GS Paper III: Economy

**TOPICS COVERED**

**08\_12\_2025**

1.

**Does currency depreciation always help?**  
क्या मुद्रा अवमूल्यन हमेशा सहायक होता है?



# Does currency depreciation always help?

GS III: Economy

MOE

B. Bhagwan Das

The Rupee has depreciated to ₹90.41 against the U.S. Dollar on December 3, 2025 which is a new record. It is among the worst performing currencies in recent times. Experts attribute this steep fall of the Indian Rupee to FPI and other capital outflows due to more attractive investment opportunities in AI stocks in other markets, delayed conclusion of trade deals especially with the U.S., decline in exports due to the penal U.S. tariffs and global trade uncertainty, widening current and capital account deficits due to capital outflows, sanctions on the import of cheap Russian oil pushing up overall crude oil import expenditure due to more expensive alternative sources, and rising import costs of gold due to the prevailing high prices of gold.

## Exports lucrative

Neither the economists at the Finance Ministry, nor the economists at the Reserve Bank of India seem to be unduly perturbed by a steeply depreciating Rupee, as the domestic rate of inflation is well below the tolerable range of 2 to 6%, GDP is growing at a healthy rate of around 8% in the first two quarters of this financial year and agriculture, manufacturing and services are performing according to expectations. Some even argue that the weightage of import prices in our Consumer Price Index is too minimal to have a significant impact on our domestic rate of inflation. Moreover the recent GST rate reduction and rationalisation, and the huge public capital expenditure on infrastructure and other sectors is likely to lead to a domestic demand revival and sustain the growth mo-



**Prop up:** It is possible to gain from global trade on boosting productivity of labour, capital via investments. GETTY IMAGES/ISTOCK

mentum of the economy.

Some economists welcome rupee depreciation as it cheapens our exports and make them attractive for foreign buyers, while rendering our imports unattractive for domestic consumers. But does a falling rupee really help our economy? For this we have to examine what economic theory has to offer on the subject.

Let us consider a simple textbook example of trade between two countries, involving only two commodities, namely, wheat and cloth.

Let the two countries be U.S. and India. Let both the countries produce both the products. However each would like to specialise only in one product, export it and import the other product. Let us assume that the U.S. is more productive than India and as a result, there are differences in wage rates between the two countries.

We assume that the workers in the U.S. work one hour each in producing 6 bushels of wheat and 4 yards of cloth and earn \$6 per hour. Similarly, the workers in India work one hour each in producing 1 bushel of wheat and 2 yards of cloth and get paid ₹100 per hour. If labour

cost is the only cost that determines the per unit price of wheat and cloth, then using the rupee-dollar exchange rate, it is possible to identify a basis for mutually beneficial trade between the two countries.

Initially, let us consider a hypothetical exchange rate of ₹20:\$1. Using this exchange rate and the prevailing wage rate per hour in the two countries, let us express the per unit price of wheat and cloth in dollars alone. Accordingly, in the U.S. one bushel of wheat will cost \$1 and one yard of cloth will cost \$1.5. Likewise in India, when the wage rate in rupees is converted into dollars using the above exchange rate, one bushel of wheat will cost \$5 and one yard of cloth will cost \$2.5.

## U.S. cheapest

Therefore, at the exchange rate of ₹20:\$1, there is no basis for mutually beneficial trade between the two countries, as U.S. turns out to be the cheapest producer of both the products.

U.S. would like to export both to India while India will have nothing to give in return. Now, let us make the rupee cheaper against the dollar by considering an exchange rate of ₹40:\$1.

Using this exchange rate and the prevailing wage rate per hour, expressed in dollars for both the countries, one bushel of wheat will cost \$1 in the U.S. and \$2.5 in India, while one yard of cloth will cost \$1.5 in the U.S. and \$1.25 in India. At this exchange rate, mutually beneficial trade is possible between the two nations, as wheat is relatively cheaper in the U.S. while cloth is relatively cheaper in India. U.S. will specialise in wheat production and export it in return for Indian cloth.

So, in this simple illustration, rupee depreciation against the dollar has helped India achieve trade parity with the U.S. If the rupee depreciates even further, let's say to ₹60 per dollar, the trade benefit to India will be even better.

## Widen CAD

But there is also a downside to rupee depreciation. India being largely an importing nation, currency depreciation will make imports even more expensive and widen India's current account deficit (CAD) as a percentage of its GDP. The fall in the international value of the rupee may have domestic consequences as well. The domestic rate of inflation will rise and the RBI may adopt a tight money policy to counter this, which will further hurt investment and growth.

Capital flows to India may also decline because of a rising current account deficit and a rising domestic rate of inflation, which will further weaken the rupee internationally. All this proves that there is a limit beyond which currency depreciation does not help a nation economically.

Now, consider a totally different scenario. India manages to improve farm labour productivity, by in-

vesting in suitable production technologies, while conditions in the U.S. remain the same. Assume in India, workers now produce 4 bushels of wheat per hour and 3.5 yards of cloth per hour, while U.S. workers continue to produce 6 bushels of wheat and 4 yards of cloth per hour, respectively.

The wage rate in both the countries also remains the same as before, i.e., \$6 per hour in the U.S. and ₹100 per hour in India. Even at the earlier exchange rate of ₹20:\$1, trade between India and the U.S. now becomes mutually beneficial. In terms of per unit prices, 1 bushel of wheat will cost \$1 in the U.S. and \$1.25 in India, while 1 yard of cloth will cost \$1.5 in the U.S. and \$1.43 in India. Since wheat is relatively cheaper in the U.S. and cloth is relatively cheaper in India, U.S. will specialise in wheat production and India in cloth production and they will exchange their respective products of specialisation.

So, even with a relatively stronger rupee, it is possible to gain from international trade, if we improve the productivity of labour and capital through appropriate investments in research and development, transport infrastructure, energy, education and health. If through economic policy, we are able to remove the impediments to improved productivity, then it is not necessary to rely on currency depreciation to improve our export performance. Currency depreciation can at best be a short term measure to boost exports and bridge the short run trade deficit. The solution however lies in improving overall economic efficiency, for which huge investments have to be made in the areas men-

tioned above.

In conclusion it can be said while currency depreciation leads to a rise in overall export value, it need not necessarily result in a rise in export volume. Therefore, currency depreciation contributing to improved export competitiveness is only one side of the story. The other side depends on export capacity and productivity, the prevailing opportunities for exports and bilateral trade relations and pacts.

Given the current geopolitical and trade uncertainties plaguing the world economy, it is too much to expect a falling rupee to boost India's exports unless there is progress on the other fronts as well.

No doubt the U.S. dollar is strengthening against other currencies, as is the price of gold in the global market, since both are considered as safe haven investments, when faced with global economic and political unrest. The war in Europe shows no signs of abatement while war clouds are gathering on the horizon near Venezuela. Therefore it is advisable for the Reserve Bank of India and the Government of India to put in place a strategy to counter the rupee depreciation by offering exporters interest rate rebates and incentives to deposit their dollar earnings in India, offer attractive terms and rates of interest on dollar-denominated bonds and NRI deposits, encourage corporates to speed up dollar borrowing plans and deposit dollar earnings in local banks and encourage local banks to enter into currency swaps with American banks.

(B. Bhagwan Das is Former Associate Professor of Economics, Loyola College, Chennai)

## Does currency depreciation always help?

### क्या मुद्रा अवमूल्यन हमेशा सहायक होता है?

- The Rupee has depreciated to ₹90.41 against the U.S. Dollar on December 3, 2025, which is a new record.  
रुपया 3 दिसंबर, 2025 को यू.एस. डॉलर के मुकाबले ₹90.41 तक अवमूल्यित हुआ, जो एक नया रिकॉर्ड है।
- It is among the worst performing currencies in recent times.  
यह हाल के समय की सबसे खराब प्रदर्शन करने वाली मुद्राओं में से एक है।
- Experts attribute this steep fall of the Indian Rupee to FPI and other capital outflows due to more attractive investment opportunities in AI stocks in other markets, delayed conclusion of trade deals especially with the U.S., decline in exports due to the penal U.S. tariffs and global trade uncertainty, widening current and capital account deficits due to capital outflows, sanctions on the import of cheap Russian oil pushing up overall crude oil import expenditure due to more expensive alternative sources, and rising import costs of gold due to the prevailing high prices of gold.



विशेषज्ञ इस तेज गिरावट को **विदेशी पोर्टफोलियो निवेश (FPI) और अन्य पूंजी प्रवाह** के कारण मानते हैं, जो अन्य बाजारों में **AI स्टॉक्स** में अधिक आकर्षक निवेश अवसरों, विशेष रूप से **यू.एस.** के साथ व्यापार समझौतों में देरी, दंडात्मक **यू.एस. शुल्क** के कारण निर्यात में गिरावट, पूंजी प्रवाह के कारण **वर्तमान और पूंजी खाता घाटा** का बढ़ना, सस्ते **रूसी तेल** के आयात पर प्रतिबंध जिससे अधिक महंगे विकल्पों के कारण कुल **कूड आयात व्यय** बढ़ गया, और उच्च **सोने** की कीमतों के कारण सोने के आयात लागत में वृद्धि से जोड़ा जाता है।

- Neither the economists at the **Finance Ministry**, nor the economists at the **Reserve Bank of India** seem to be unduly perturbed by a steeply depreciating Rupee, as the domestic rate of **inflation** is well below the tolerable range of 2 to 6%, **GDP** is growing at a healthy rate of around 8% in the first two quarters of this financial year and **agriculture, manufacturing and services** are performing according to expectations.

**वित्त मंत्रालय** के अर्थशास्त्री और **भारतीय रिजर्व बैंक** के अर्थशास्त्री भी तेज़ी से अवमूल्यित हो रहे रुपया को लेकर विशेष रूप से चिंतित नहीं लगते, क्योंकि घरेलू **मुद्रास्फीति** दर 2 से 6% की सहनीय सीमा से काफी नीचे है, **GDP** इस वित्तीय वर्ष की पहली दो तिमाहियों में लगभग 8% की स्वस्थ दर से बढ़ रहा है और **कृषि, विनिर्माण और सेवाएँ** अपेक्षाओं के अनुसार प्रदर्शन कर रही हैं।

- Some even argue that the weightage of import prices in our **Consumer Price Index** is too minimal to have a significant impact on our domestic rate of inflation.  
कुछ लोग यह भी तर्क करते हैं कि हमारे **उपभोक्ता मूल्य सूचकांक (CPI)** में आयात मूल्य का भार इतना न्यून है कि यह घरेलू मुद्रास्फीति दर पर महत्वपूर्ण प्रभाव नहीं डालता।

- Moreover, the recent **GST rate reduction and rationalisation**, and the huge public **capital expenditure** on infrastructure and other sectors is likely to lead to a domestic **demand revival** and sustain the **growth momentum** of the economy.

इसके अलावा, हाल ही में **GST दर में कमी और तर्कसंगतकरण**, और बुनियादी ढांचे और अन्य क्षेत्रों पर विशाल सार्वजनिक **पूंजीगत व्यय** से घरेलू मांग में **पुनरुद्धार** होगा और अर्थव्यवस्था की **विकास गति** बनी रहेगी।

- Some economists welcome **rupee depreciation** as it cheapens our **exports** and make them attractive for **foreign buyers**, while rendering our **imports** unattractive for domestic consumers.

कुछ अर्थशास्त्री **रुपया अवमूल्यन** का स्वागत करते हैं क्योंकि यह हमारे **निर्यात** को सस्ता बनाता है और इसे **विदेशी खरीदारों** के लिए आकर्षक बनाता है, जबकि हमारे **आयात** को घरेलू उपभोक्ताओं के लिए अप्रिय बनाता है।

- But does a falling rupee really help our economy?  
लेकिन क्या गिरता हुआ रुपया वास्तव में हमारी अर्थव्यवस्था में मदद करता है?
- For this we have to examine what economic theory has to offer on the subject.  
इसके लिए हमें यह देखना होगा कि इस विषय पर आर्थिक सिद्धांत क्या पेश करता है।
- Let us consider a simple textbook example of trade between two countries, involving only two commodities, namely, **wheat and cloth**.  
आइए दो देशों के बीच व्यापार का एक सरल पाठ्यपुस्तक उदाहरण देखें, जिसमें केवल दो वस्तुएँ शामिल हैं, अर्थात् **गेहूँ और कपड़ा**।

- Let the two countries be **U.S. and India**. Let both the countries produce both the products.  
मान लें कि दो देश हैं **यू.एस. और भारत**। दोनों देश दोनों उत्पादों का उत्पादन करते हैं।

- However each would like to specialise only in one product, export it and import the other product.

हालांकि प्रत्येक केवल एक उत्पाद में विशेषज्ञता करना चाहता है, उसे निर्यात करना चाहता है और दूसरे उत्पाद को आयात करना चाहता है।

- Let us assume that the **U.S. is more productive than India** and as a result, there are differences in **wage rates** between the two countries.

मान लें कि **यू.एस. भारत की तुलना में अधिक उत्पादक है**, और परिणामस्वरूप, दोनों देशों के बीच **मजदूरी दरों** में अंतर है।

- We assume that the workers in the **U.S. work one hour each in producing 6 bushels of wheat and 4 yards of cloth** and earn **\$6 per hour**.

हम मानते हैं कि **यू.एस. में श्रमिक प्रत्येक घंटे 6 बुशेल गेहूँ और 4 गज कपड़ा** का उत्पादन करते हैं और **\$6 प्रति घंटा** कमाते हैं।

- Similarly, the workers in **India work one hour each in producing 1 bushel of wheat and 2 yards of cloth** and get paid **₹100 per hour**.



इसी तरह, भारत में श्रमिक प्रत्येक घंटे 1 बुशेल गेहूं और 2 गज कपड़ा का उत्पादन करते हैं और उन्हें ₹100 प्रति घंटा वेतन मिलता है।

- If labour cost is the only cost that determines the per unit price of wheat and cloth, then using the **rupee-dollar exchange rate**, it is possible to identify a basis for mutually beneficial trade between the two countries.  
यदि मजदूरी लागत ही केवल लागत है जो गेहूं और कपड़ा की प्रति इकाई कीमत निर्धारित करती है, तो **रुपया-डॉलर विनिमय दर** का उपयोग करके दोनों देशों के बीच परस्पर लाभकारी व्यापार का आधार पहचाना जा सकता है।
- Initially, let us consider a hypothetical exchange rate of **₹20: \$1**.  
प्रारंभ में, आइए **₹20: \$1** की काल्पनिक विनिमय दर पर विचार करें।
- Using this exchange rate and the prevailing wage rate per hour in the two countries, let us express the per unit price of wheat and cloth in dollars alone.  
इस विनिमय दर और दोनों देशों में प्रचलित प्रति घंटे मजदूरी दर का उपयोग करते हुए, आइए केवल डॉलर में गेहूं और कपड़े की प्रति इकाई कीमत व्यक्त करें।
- Accordingly, in the **U.S. one bushel of wheat will cost \$1 and one yard of cloth will cost \$1.5**.  
तदनुसार, **यू.एस. में एक बुशेल गेहूं की कीमत \$1 होगी और एक गज कपड़े की कीमत \$1.5 होगी।**
- Likewise in **India**, when the wage rate in rupees is converted into dollars using the above exchange rate, **one bushel of wheat will cost \$5 and one yard of cloth will cost \$2.5**.  
इसी तरह, **भारत में**, जब रुपये में मजदूरी दर को ऊपर दी गई विनिमय दर का उपयोग करके डॉलर में परिवर्तित किया जाता है, तो **एक बुशेल गेहूं की कीमत \$5 होगी और एक गज कपड़े की कीमत \$2.5 होगी।**
- **U.S. cheapest**  
**यू.एस. सबसे सस्ता**
- Therefore, at the exchange rate of **₹20:\$1**, there is no basis for mutually beneficial trade between the two countries, as **U.S. turns out to be the cheapest producer of both the products**.  
इसलिए, **₹20:\$1** की विनिमय दर पर, दोनों देशों के बीच परस्पर लाभकारी व्यापार का कोई आधार नहीं है, क्योंकि **यू.एस. दोनों उत्पादों का सबसे सस्ता उत्पादक साबित होता है।**
- U.S. would like to export both to **India** while India will have nothing to give in return.  
यू.एस. दोनों को **भारत** में निर्यात करना चाहेगा जबकि भारत के पास लौटकर देने के लिए कुछ नहीं होगा।
- Now, let us make the **rupee cheaper against the dollar** by considering an exchange rate of **₹40:\$1**.  
अब, आइए **₹40:\$1** की विनिमय दर को देखकर **रुपया को डॉलर के मुकाबले सस्ता बनाएं।**
- Using this exchange rate and the prevailing wage rate per hour, expressed in dollars for both the countries, **one bushel of wheat will cost \$1 in the U.S. and \$2.5 in India, while one yard of cloth will cost \$1.5 in the U.S. and \$1.25 in India**.  
इस विनिमय दर और प्रति घंटे प्रचलित मजदूरी दर का उपयोग करते हुए, दोनों देशों के लिए डॉलर में व्यक्त करें, **यू.एस. में एक बुशेल गेहूं की कीमत \$1 होगी और भारत में \$2.5, जबकि यू.एस. में एक गज कपड़े की कीमत \$1.5 होगी और भारत में \$1.25।**
- At this exchange rate, mutually beneficial trade is possible between the two nations, as **wheat is relatively cheaper in the U.S. while cloth is relatively cheaper in India**.  
इस विनिमय दर पर, दोनों देशों के बीच परस्पर लाभकारी व्यापार संभव है, क्योंकि **यू.एस. में गेहूं अपेक्षाकृत सस्ता है जबकि भारत में कपड़ा अपेक्षाकृत सस्ता है।**
- **US will specialise in wheat production and export it in return for Indian cloth**.  
**यू.एस. गेहूं उत्पादन में विशेषज्ञता करेगा और भारतीय कपड़े के बदले इसे निर्यात करेगा।**
- So, in this simple illustration, **rupee depreciation against the dollar has helped India achieve trade parity with the U.S.**  
तो, इस सरल उदाहरण में, **डॉलर के मुकाबले रुपया अवमूल्यन ने भारत को यू.एस. के साथ व्यापार समानता प्राप्त करने में मदद की है।**
- If the rupee depreciates even further, let's say to **₹60 per dollar**, the trade benefit to India will be even better.  
यदि रुपया और अधिक अवमूल्यित होता है, मान लीजिए **₹60 प्रति डॉलर**, तो भारत के लिए व्यापार लाभ और बेहतर होगा।



## Widen CAD

### वर्तमान खाता घाटा बढ़ाना

- But there is also a downside to **rupee depreciation**.  
लेकिन **रुपया अवमूल्यन** का एक नकारात्मक पक्ष भी है।
- India being largely an importing nation, **currency depreciation** will make imports even more expensive and widen India's **current account deficit (CAD)** as a percentage of its **GDP**.  
भारत मुख्य रूप से एक आयातक देश होने के नाते, **मुद्रा अवमूल्यन** आयात को और महंगा बना देगा और भारत का **वर्तमान खाता घाटा (CAD) GDP** के प्रतिशत के रूप में बढ़ जाएगा।
- The fall in the international value of the **rupee** may have domestic consequences as well.  
**रुपया** के अंतर्राष्ट्रीय मूल्य में गिरावट का घरेलू परिणाम भी हो सकता है।
- The domestic rate of **inflation** will rise and the **RBI** may adopt a tight money policy to counter this, which will further hurt investment and growth.  
घरेलू **मुद्रास्फीति** दर बढ़ जाएगी और **RBI** इसका मुकाबला करने के लिए कड़ी मुद्रा नीति अपना सकता है, जिससे निवेश और विकास को और नुकसान होगा।
- **Capital flows to India may also decline** because of a rising **current account deficit** and a rising domestic rate of **inflation**, which will further weaken the **rupee internationally**.  
**भारत में पूंजी प्रवाह भी घट सकता है** क्योंकि बढ़ते **वर्तमान खाता घाटा** और बढ़ती घरेलू **मुद्रास्फीति** दर, जो **रुपया को अंतर्राष्ट्रीय स्तर पर और कमजोर** करेगी।
- All this proves that there is a limit beyond which **currency depreciation does not help a nation economically**.  
यह सब साबित करता है कि एक सीमा है, जिसके परे **मुद्रा अवमूल्यन किसी राष्ट्र की आर्थिक मदद नहीं करता**।
- Now, consider a totally different scenario. India manages to improve **farm labour productivity**, by investing in suitable **production technologies**, while conditions in the **U.S.** remain the same.  
अब, एक पूरी तरह अलग परिदृश्य पर विचार करें। भारत **कृषि श्रम उत्पादकता** में सुधार करने में सक्षम होता है, उपयुक्त **उत्पादन प्रौद्योगिकियों** में निवेश करके, जबकि **यू.एस.** की स्थिति वही रहती है।
- Assume in India, workers now produce **4 bushels of wheat per hour and 3.5 yards of cloth per hour**, while **U.S. workers continue to produce 6 bushels of wheat and 4 yards of cloth per hour**, respectively.  
मान लें कि भारत में, श्रमिक अब **प्रति घंटे 4 बुशेल गेहूं और 3.5 गज कपड़ा** का उत्पादन करते हैं, जबकि **यू.एस.** श्रमिक क्रमशः **6 बुशेल गेहूं और 4 गज कपड़ा प्रति घंटे** का उत्पादन जारी रखते हैं।
- The wage rate in both the countries also remains the same as before, i.e., **\$6 per hour in the U.S. and ₹100 per hour in India**.  
दोनों देशों में मजदूरी दर पहले जैसी ही रहती है, अर्थात् **यू.एस. में \$6 प्रति घंटा और भारत में ₹100 प्रति घंटा**।
- Even at the earlier exchange rate of **₹20:\$1**, trade between India and the **U.S.** now becomes mutually beneficial.  
यहां तक कि **₹20:\$1** की पूर्व विनिमय दर पर भी, भारत और यू.एस. के बीच व्यापार अब परस्पर लाभकारी हो जाता है।
- In terms of per unit prices, **1 bushel of wheat will cost \$1 in the U.S. and \$1.25 in India, while 1 yard of cloth will cost \$1.5 in the US and \$1.43 in India**.  
प्रति इकाई कीमतों के मामले में, **यू.एस. में 1 बुशेल गेहूं की कीमत \$1 होगी और भारत में \$1.25, जबकि यू.एस. में 1 गज कपड़े की कीमत \$1.5 होगी और भारत में \$1.43**।
- Since wheat is relatively cheaper in the **U.S.** and cloth is relatively cheaper in **India**, **U.S.** will specialise in wheat production and India in cloth production and they will exchange their respective products of specialisation.  
चूंकि गेहूं अपेक्षाकृत **यू.एस.** में सस्ता है और कपड़ा अपेक्षाकृत **भारत** में सस्ता है, यू.एस. गेहूं उत्पादन में विशेषज्ञता करेगा और भारत कपड़ा उत्पादन में, और वे अपने संबंधित विशेषज्ञता उत्पादों का आदान-प्रदान करेंगे।
- So, even with a relatively stronger **rupee**, it is possible to gain from international trade, if we improve the productivity of **labour and capital** through appropriate investments in **research and development, transport infrastructure, energy, education and health**.  
तो, अपेक्षाकृत मजबूत **रुपया** होने के बावजूद, अंतर्राष्ट्रीय व्यापार से लाभ लेना संभव है, यदि हम **श्रम और**



पूँजी की उत्पादकता में सुधार करें उपयुक्त निवेश के माध्यम से **अनुसंधान और विकास, परिवहन अवसंरचना, ऊर्जा, शिक्षा और स्वास्थ्य** में।

- If through economic policy, we are able to remove the impediments to improved productivity, then it is not necessary to rely on **currency depreciation** to improve our **export performance**.  
यदि आर्थिक नीति के माध्यम से हम उत्पादकता में सुधार के लिए बाधाओं को हटा सकते हैं, तो हमारे **निर्यात प्रदर्शन** को बेहतर बनाने के लिए **मुद्रा अवमूल्यन** पर निर्भर होना आवश्यक नहीं है।
- Currency depreciation can at best be a short term measure to boost **exports** and bridge the short run **trade deficit**.  
मुद्रा अवमूल्यन केवल अल्पकालिक उपाय हो सकता है **निर्यात** को बढ़ावा देने और अल्पकालिक **व्यापार घाटे** को पाटने के लिए।
- The solution however lies in improving overall **economic efficiency**, for which huge investments have to be made in the areas mentioned above.  
हालांकि समाधान कुल **आर्थिक दक्षता** में सुधार करने में निहित है, जिसके लिए उपरोक्त क्षेत्रों में बड़े निवेश करने होंगे।
- In conclusion, it can be said while **currency depreciation** leads to a rise in overall **export value**, it need not necessarily result in a rise in **export volume**.  
निष्कर्षतः कहा जा सकता है कि जब **मुद्रा अवमूल्यन** कुल **निर्यात मूल्य** में वृद्धि करता है, यह जरूरी नहीं कि **निर्यात मात्रा** में वृद्धि भी हो।
- Therefore, currency depreciation contributing to improved **export competitiveness** is only one side of the story.  
इसलिए, बेहतर **निर्यात प्रतिस्पर्धात्मकता** में योगदान देने वाला मुद्रा अवमूल्यन केवल कहानी का एक पक्ष है।
- The other side depends on **export capacity and productivity, the prevailing opportunities for exports and bilateral trade relations and pacts**.  
दूसरा पक्ष निर्भर करता है **\*\*निर्यात क्षमता और उत्पादकता, निर्यात के वर्तमान अवसर और द्विपक्षीय व्यापार संबंध और समझौते**

### GS Paper III: S&T

#### TOPICS COVERED

08\_12\_2025

1.	<b>National intelligence grid gains traction as Central agencies, police scour for information</b> राष्ट्रीय खुफिया ग्रिड को बढ़ती लोकप्रियता, केंद्रीय एजेंसियां और पुलिस जानकारी की खोज में
2.	<b>Filaments: gentle giants in space</b> फिलामेंट्स: अंतरिक्ष में कोमल दैत्य
3.	<b>Swap app mandates for digital literacy</b> ऐप अनिवार्यता की जगह डिजिटल साक्षरता अपनाएँ
4.	<b>What are concerns over the draft ISI Bill, 2025?</b> ड्राफ्ट आईएसआई विधेयक, 2025 को लेकर क्या चिंताएँ हैं?



# National intelligence grid gains traction as Central agencies, police scour for information

GS III: S&T

**Vijaita Singh**

NEW DELHI

The National Intelligence Grid (NATGRID), a platform for the police and investigating agencies to securely access government and private databases in real time, is getting around 45,000 requests a month, government officials told *The Hindu*.

The platform, accessible only to security agencies, became operational last year after first being conceptualised in 2009 in the aftermath of the 26/11 Mumbai terror attacks.

At the recent conference of Directors-General of Police, chaired by Prime Minister Narendra Modi in Raipur, the law enforcement agencies, including State police, were asked to scale up the use of NATGRID in all investigations.

## Seamless flow

The National Intelligence Grid was conceptualised in 2009. It became operational last year

■ NATGRID is a platform for the police and investigating agencies to access government and private databases in real time

■ Union Home Ministry has asked States to liberally use the platform to access datasets, which include details of driving licence, Aadhaar registration, airline data, bank records, and also details of social



media accounts which share posts on a particular issue

■ Access to NATGRID is now available to Superintendent of Police-rank officers. Earlier, it was only meant to be accessible to 10 Central agencies

The Union Home Ministry has asked States to liberally use the platform to access datasets, which include details of driving licence, Aadhaar registration, airline data, bank records, and also details of social media accounts which share posts on a particular issue.

Access to NATGRID is now available to Superin-

tendent of Police-rank officers. Earlier, it was only meant to be accessible to 10 Central agencies, such as the Intelligence Bureau, Research and Analysis Wing, National Investigation Agency, Enforcement Directorate, Financial Intelligence Unit, Narcotics Control Bureau, and the Directorate of Revenue Intelligence.

Several State police officials told *The Hindu* that they faced certain hurdles while accessing the information on the platform.

## Time consuming

An official said that logging on the portal required a lot of time, while another official said they had to wait longer to get the desired information, even though the platform is supposed to provide real-time data.

The platform, which had been in the works for over a decade and was first envisaged under Congress leader P. Chidambaram, received a fresh momentum under Home Minister Amit Shah in 2019. Under Mr. Shah, the differences between various security agencies were ironed out, and the application was made accessible to even the State police.

The government is taking several steps to enhance security and maintain the sanctity of data in the wake of repeated cyberattack attempts on critical infrastructure in the country, official sources said.

In 2024, India witnessed over 20.41 lakh cybersecurity-related incidents, the highest number of incidents since 2020.

"Instead of security agencies seeking data from multiple sources, NATGRID provides the information on a single platform. The confidentiality of the user is maintained, and the registration of a first information report (FIR) is not necessary. Information can be secured to join the dots during an investigation or to develop intelligence," said another government official.

## National intelligence grid gains traction as Central agencies, police scour for information

राष्ट्रीय खुफिया ग्रिड को बढ़ती लोकप्रियता, केंद्रीय एजेंसियां और पुलिस जानकारी की खोज में

- The **National Intelligence Grid (NATGRID)**, a platform for the **police and investigating agencies** to securely access **government and private databases** in real time, is getting around **45,000 requests a month**, government officials told **The Hindu**.

राष्ट्रीय खुफिया ग्रिड (NATGRID), पुलिस और जांच एजेंसियों के लिए एक प्लेटफॉर्म है जो वास्तविक समय में सरकारी और निजी डेटाबेस तक सुरक्षित पहुँच प्रदान करता है, और इसे सरकार के अधिकारियों ने **The Hindu** को बताया कि इसे लगभग **45,000 अनुरोध प्रति माह** मिल रहे हैं।

- The platform, accessible only to **security agencies**, became operational last year after first being conceptualised in **2009** in the aftermath of the **26/11 Mumbai terror attacks**.

प्लेटफॉर्म, जो केवल **सुरक्षा एजेंसियों** के लिए सुलभ है, पिछले साल कार्यात्मक हुआ, जबकि इसे पहली बार **2009 में 26/11 मुंबई आतंकवादी हमलों** के बाद कल्पित किया गया था।

- At the recent conference of **Directors-General of Police**, chaired by **Prime Minister Narendra Modi** in **Raipur**, the law enforcement agencies, including **State police**, were asked to scale up the use of **NATGRID** in all investigations.

हाल ही में **रायपुर** में **प्रधानमंत्री नरेंद्र मोदी** की अध्यक्षता में हुई **पुलिस महानिदेशकों** की सम्मेलन में, **राज्य पुलिस** सहित कानून प्रवर्तन एजेंसियों से सभी जांचों में **NATGRID** के उपयोग को बढ़ाने के लिए कहा गया।

- The **Union Home Ministry** has asked **States** to liberally use the platform to access datasets, which include details of **driving licence, Aadhaar registration, airline data, bank records**, and also details of **social media accounts** which share posts on a particular issue.

**केंद्रीय गृह मंत्रालय** ने **राज्यों** से कहा है कि वे प्लेटफॉर्म का स्वतंत्र रूप से उपयोग करें ताकि डेटासेट तक पहुँच बनाई जा सके, जिसमें **ड्राइविंग लाइसेंस, आधार पंजीकरण, एयरलाइन डेटा, बैंक रिकॉर्ड**, और विशेष मुद्दे पर पोस्ट साझा करने वाले **सोशल मीडिया अकाउंट्स** का विवरण शामिल है।



- Access to **NATGRID** is now available to **Superintendent of Police-rank officers**. Earlier, it was only meant to be accessible to **10 Central agencies**, such as the **Intelligence Bureau, Research and Analysis Wing, National Investigation Agency, Enforcement Directorate, Financial Intelligence Unit, Narcotics Control Bureau, and the Directorate of Revenue Intelligence**.  
अब **NATGRID** तक पहुँच **सुपरिन्टेंडेंट ऑफ पुलिस-रैंक अधिकारियों** को उपलब्ध है। पहले, यह केवल **10 केंद्रीय एजेंसियों** के लिए सुलभ था, जैसे कि **इंटेलिजेंस ब्यूरो, रिसर्च एंड एनालिसिस विंग, नेशनल इन्वेस्टिगेशन एजेंसी, एन्फोर्समेंट डायरेक्टोरेट, फाइनेंशियल इंटेलिजेंस यूनिट, नारकोटिक्स कंट्रोल ब्यूरो, और रेवेन्यू इंटेलिजेंस डायरेक्टोरेट**।
- Several **State police officials** told **The Hindu** that they faced certain hurdles while accessing the information on the platform.  
कई **राज्य पुलिस अधिकारियों** ने **The Hindu** को बताया कि उन्हें प्लेटफॉर्म पर जानकारी तक पहुँचने में कुछ बाधाओं का सामना करना पड़ा।

### Time consuming समय लेने वाला

- An official said that logging on the portal required a lot of time, while another official said they had to wait longer to get the desired information, even though the platform is supposed to provide **real-time data**.  
एक अधिकारी ने कहा कि पोर्टल में लॉग इन करने में बहुत समय लगता है, जबकि एक अन्य अधिकारी ने कहा कि उन्हें इच्छित जानकारी प्राप्त करने में अधिक समय लगना पड़ता है, हालांकि प्लेटफॉर्म को **रीयल-टाइम डेटा** प्रदान करना चाहिए।
- The platform, which had been in the works for over a decade and was first envisaged under **Congress leader P. Chidambaram**, received a fresh momentum under **Home Minister Amit Shah** in **2019**.  
प्लेटफॉर्म, जो एक दशक से अधिक समय से विकसित हो रहा था और जिसे पहली बार **कांग्रेस नेता पी. चिदंबरम** के तहत कल्पित किया गया था, को **2019** में **गृह मंत्री अमित शाह** के तहत नई गति मिली।
- Under Mr. Shah, the differences between various **security agencies** were ironed out, and the application was made accessible to even the **State police**.  
श्री शाह के तहत विभिन्न **सुरक्षा एजेंसियों** के बीच मतभेद दूर किए गए, और यह आवेदन **राज्य पुलिस** के लिए भी सुलभ बना दिया गया।
- The government is taking several steps to enhance security and maintain the sanctity of data in the wake of repeated **cyberattack attempts** on critical infrastructure in the country, official sources said.  
सरकारी सूत्रों ने कहा कि देश में महत्वपूर्ण अवसंरचना पर बार-बार होने वाले **साइबर हमलों** के मद्देनजर सुरक्षा बढ़ाने और डेटा की पवित्रता बनाए रखने के लिए सरकार कई कदम उठा रही है।
- In **2024**, India witnessed over **20.41 lakh cybersecurity-related incidents**, the highest number of incidents since **2020**.  
**2024** में, भारत में **20.41 लाख से अधिक साइबर सुरक्षा से संबंधित घटनाएँ** हुईं, जो **2020** के बाद सबसे अधिक संख्या है।
- “Instead of security agencies seeking data from multiple sources, **NATGRID** provides the information on a single platform.  
“कई स्रोतों से डेटा प्राप्त करने के बजाय, **NATGRID** एक ही प्लेटफॉर्म पर जानकारी प्रदान करता है।
- The confidentiality of the user is maintained, and the registration of a **first information report (FIR)** is not necessary.  
उपयोगकर्ता की गोपनीयता बनाए रखी जाती है, और **प्रथम सूचना रिपोर्ट (FIR)** दर्ज करने की आवश्यकता नहीं है।
- Information can be secured to join the dots during an investigation or to develop **intelligence**,” said another government official.  
जानकारी को एक जांच के दौरान जोड़ने या **खुफिया** विकसित करने के लिए सुरक्षित किया जा सकता है,” एक अन्य सरकारी अधिकारी ने कहा।



# Filaments: gentle giants in space

**GS III: S&T**

**Vasudevan Mukunth**

**C**osmic or galaxy filaments are the largest “threads” in the universe’s cosmic web. A single cosmic filament is a structure spanning hundreds of millions of lightyears, formed as a result of gravity pulling in gas, dark matter, and galaxies into long, thin strands that link giant clusters of galaxies. Filaments also surround large, empty regions of space called voids.

A filament forms where sheets of matter intersect and collapse; they’re also highways along which gas and smaller galaxies “flow” towards big clusters. As material falls in, it can spin up both the filament and the galaxies embedded in it.

Because of this, filaments help decide where galaxies form, how fast they grow, and how much fresh gas they receive over billions of years.

Astronomers map filaments by measuring the positions and distances of many galaxies and then tracing the patterns they form in the sky.

Computer simulations have shown similar webs, giving astronomers confidence that these structures arise naturally from small ripples in the early universe and grew under gravity’s influence into the vast, connected network we see today.

On December 3, University of Oxford researchers reported a roughly 50-million-lightyear-long filament traced by at least 14 galaxies. In particular, the team found the way the galaxies were spinning lined up with the



A computer model showing filaments, walls, and voids forming web-like structures in the universe. ANDREW PONTZEN AND FABIO GOVERNATO

filament, suggesting the entire filament was slowly rotating. Thus the team has claimed it is “one of the largest spinning structures ever found in the universe.”

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## Filaments: gentle giants in space

### फिलामेंट्स: अंतरिक्ष में कोमल दैत्य

- Cosmic or galaxy filaments are the largest “threads” in the universe’s cosmic web.  
**कॉस्मिक या गैलेक्सी फिलामेंट्स** ब्रह्मांड के कॉस्मिक वेब में सबसे बड़े “threads” हैं।
- A single cosmic filament is a structure spanning hundreds of millions of lightyears, formed as a result of gravity pulling in gas, dark matter, and galaxies into long, thin strands that link giant clusters of galaxies.  
एक अकेला कॉस्मिक फिलामेंट **सैकड़ों मिलियन lightyears** में फैला एक ढांचा है, जो गुरुत्वाकर्षण द्वारा



गैस, **dark matter**, और आकाशगंगाओं को खींचकर लंबे, पतले धागों में बदलने से बनता है, जो विशाल **galaxy clusters** को जोड़ते हैं।

- Filaments also surround large, empty regions of space called voids.  
फिलामेंट्स अंतरिक्ष के बड़े, खाली क्षेत्रों को भी घेरते हैं जिन्हें **voids** कहा जाता है।
- A filament forms where sheets of matter intersect and collapse; they're also highways along which gas and smaller galaxies "flow" towards big clusters.  
एक फिलामेंट वहाँ बनता है जहाँ पदार्थ की चादरें आपस में मिलकर ढह जाती हैं; ये वे हाईवे भी हैं जिनके along गैस और छोटी आकाशगंगाएँ बड़े क्लस्टरों की ओर "flow" करती हैं।
- As material falls in, it can spin up both the filament and the galaxies embedded in it.  
जैसे ही पदार्थ अंदर गिरता है, वह फिलामेंट और उसमें स्थित आकाशगंगाओं दोनों को **spin** करा सकता है।
- Because of this, filaments help decide where galaxies form, how fast they grow, and how much fresh gas they receive over billions of years.  
इसी कारण, फिलामेंट्स यह तय करने में मदद करते हैं कि आकाशगंगाएँ कहाँ बनेंगी, कितनी तेज़ी से बढ़ेंगी, और **अरबों वर्षों** में उन्हें कितनी नई गैस मिलेगी।
- Astronomers map filaments by measuring the positions and distances of many galaxies and then tracing the patterns they form in the sky.  
खगोलविद कई आकाशगंगाओं की स्थिति और दूरी मापकर और फिर आकाश में बने उनके पैटर्न को खोजकर फिलामेंट्स का मानचित्र बनाते हैं।
- Computer simulations have shown similar webs, giving astronomers confidence that these structures arise naturally from small ripples in the early universe and grew under gravity's influence into the vast, connected network we see today.  
कंप्यूटर सिमुलेशनों ने ऐसे ही वेब दिखाए हैं, जिससे खगोलविदों को यह विश्वास मिलता है कि ये संरचनाएँ प्रारंभिक ब्रह्मांड में छोटे तरंगों से स्वाभाविक रूप से बनीं और गुरुत्वाकर्षण के प्रभाव में बढ़कर वह विशाल, जुड़े हुए नेटवर्क बन गईं जिन्हें हम आज देखते हैं।
- On **December 3**, University of Oxford researchers reported a roughly **50-million-lightyear-long** filament traced by at least **14 galaxies**.  
**3 दिसंबर** को, **University of Oxford** के शोधकर्ताओं ने लगभग **50-million-lightyear** लंबा फिलामेंट रिपोर्ट किया, जिसे कम से कम **14 galaxies** द्वारा ट्रेस किया गया था।
- In particular, the team found the way the galaxies were spinning lined up with the filament, suggesting the entire filament was slowly rotating.  
विशेष रूप से, टीम ने पाया कि आकाशगंगाओं का **spinning** फिलामेंट की दिशा के अनुरूप था, जो संकेत देता है कि पूरा फिलामेंट धीरे-धीरे **rotate** हो रहा था।
- Thus the team has claimed it is "one of the largest spinning structures ever found in the universe."  
इस प्रकार टीम ने दावा किया है कि यह ब्रह्मांड में खोजी गई **"सबसे बड़ी घूमती संरचनाओं में से एक"** है।



# Swap app mandates for digital literacy

GS III: S&T

The government's ill-advised directive to preload its 'Sanchar Saathi' app on every new smartphone sat at the intersection of the growth of cyberfraud and identity theft and the expansion of state access to personal data. The government presented the app as a practical response to scams that exploit spoofed devices and anonymous accounts. But when the same app is given privileged access on hundreds of millions of devices, it structurally alters the state's capacity for surveillance.

Manufacturers were told to ship the app so that it was visible when a user first used a device and to make sure users couldn't disable it. Reports indicated the app would have broad access to device functions such as phone, SMS, and location, with updates pushed over the air. In a fortuitous (U-)turn of events, the government withdrew its directive following overwhelming backlash from civil society, political leaders, and digital rights activists.

## Test of necessity

The *Hindu's* editorial pointed out that the directive would fail the test of proportionality the Supreme Court articulated in *K.S. Puttaswamy* (2017) because the same ends can be met by existing portals, USSD codes, and SMS-based checks. The app may also fail the test of necessity from that judgment. (The third test is legality.) Cyber scams, including "digital arrest" frauds and investment schemes, have become more sophisticated everywhere. Interpol estimated that online financial fraud cost victims more than \$1 trillion worldwide in 2023. But in constitutional terms, "this is a serious problem" is insufficient justification; the state must show that there are no equally effective, less intrusive ways to address that problem.

However, India already has a telecom spam and fraud reporting system built around the Sanchar Saathi and CEIR portals, the TRAI 'DND' app, and the 1909 short



Vasudevan  
Mukunth

The state's focus should shift away from "what's there to hide?" to a combination of "what's there to see?" and a mission to improve digital literacy

code. The 'DND' app also offers a cautionary tale. It was designed to read call and SMS logs so that users could report spam. Apple refused for years to allow that version into its store, regarding comprehensive access to phone logs as a violation of its privacy policies. After a compromise, it added system-level tools to report spam and finally approved a narrower version of the app. The latest mandate recalled the same pattern but on a greater scale.

A privileged app that sits on almost every smartphone is an attractive target for overreach by state agencies as well as by criminal actors who manage to compromise the app itself. Cybersecurity research has repeatedly shown that once attackers obtain a foothold within a widely deployed system component, they can move laterally at scale. The problem was exacerbated by the fact that existing technologies can check device authenticity in more narrow ways accessed only on demand, and without persisting in the background.

Importantly, blanket mandates are also cynical. Digital scamsters succeed not when they steal money or credentials but when they create fear and a sense of false authority in a user's mind. Changing user behaviour is therefore more desirable than threatening to compromise the (digital) integrity of individuals and their rights.

In Kenya, researchers studying phone-based scams in 2023 developed a measure of "scam identification ability" and tested a gentle intervention based on common tips. They found generic advice did not improve users' ability to distinguish scams from genuine messages. The lesson isn't that behaviour change is irrelevant but that it cannot be adjusted by slogans. It has to be continuous, culturally sensitive, tailored to local user behaviours, and compatible with the ways in which telecom providers and state agencies communicate.

India already has the building

blocks for such a mission. The Reserve Bank of India has long run e-BAAT sessions and other outreach programmes on safe digital banking, warning users to not share PINs, passwords, and OTPs and explaining typical fraud scripts. The 'RBI Kehta Hai' campaign has taken these messages to mass media and digital platforms with a focus on responsible banking and fraud prevention. In Chhattisgarh, a cybersecurity awareness van, backed by the State government and a public sector bank, has been touring districts with street plays and demonstrations and promotes the national 1930 helpline to report financial cybercrime. Telangana's new 'Fraud Ka Full Stop' campaign combines bank customer programmes and district events to already report an 8% decline in cybercrime. Banks and local police in cities such as Tiruchi in Tamil Nadu have used mobile kiosks and public sessions to turn branches into informal cybersafety workshops.

Approaches like these offer two long-term advantages. First, an individual who has learned to distrust unsolicited links and callers and use official helplines is more digitally literate and less vulnerable to digital scams. Second, they reduce the need for repeated state intervention in the application layer and free regulators up to focus on systemic measures such as improving the traceability of large-value flows.

## Three pillars

The state's focus should shift away from "what's there to hide?" to a combination of "what's there to see?" and a mission to improve digital literacy. Such a mission should rest on three pillars: obligations on telecom and financial firms to detect and disrupt fraud patterns; functional user reporting and redress mechanisms; and a sustained public education programme on digital risks that doesn't treat citizens as passive subjects.

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## Swap app mandates for digital literacy

### ऐप अनिवार्यता की जगह डिजिटल साक्षरता अपनाएँ

- The government's ill-advised directive to preload its 'Sanchar Saathi' app on every new smartphone sat at the intersection of the growth of **cyberfraud** and **identity theft** and the expansion of state access to personal data  
सरकार का हर नए दूरभाष यंत्र में 'संचार साथी' नामक अनुप्रयोग पहले से स्थापित करने का गलत निर्णय



बढ़ते हुए साइबर ठगी, पहचान चोरी, और राज्य द्वारा व्यक्तिगत जानकारी तक बढ़ती पहुँच के मेल पर स्थित था

- The government presented the app as a practical response to scams that exploit spoofed devices and anonymous accounts  
सरकार ने इस अनुप्रयोग को उन छल योजनाओं के व्यावहारिक समाधान के रूप में प्रस्तुत किया जो नकली उपकरणों और नामरहित खातों का दुरुपयोग करती हैं
- But when the same app is given privileged access on hundreds of millions of devices, it structurally alters the state's capacity for **surveillance**  
लेकिन जब यही अनुप्रयोग करोड़ों उपकरणों पर विशेष पहुँच प्राप्त करता है, तो यह राज्य की निगरानी करने की क्षमता को संरचनात्मक रूप से बदल देता है
- Manufacturers were told to ship the app so that it was visible when a user first used a device and to make sure users couldn't disable it  
निर्माताओं को निर्देश दिया गया कि यह अनुप्रयोग उपकरण के प्रथम उपयोग पर दिखाई दे और उपयोगकर्ता इसे निष्क्रिय न कर सकें
- Reports indicated the app would have broad access to device functions such as **phone, SMS, and location**, with updates pushed over the air  
रिपोर्टों से संकेत मिला कि इस अनुप्रयोग को उपकरण के कार्यों जैसे दूरभाष, संदेश, और स्थान, तक व्यापक पहुँच होगी और अद्यतन बिना तार के ही भेजे जाएँगे
- In a fortuitous (U-)turn of events, the government withdrew its directive following overwhelming backlash from civil society, political leaders, and digital rights activists  
घटनाओं के एक सौभाग्यपूर्ण मोड़ में, सरकार ने नागरिक समाज, राजनैतिक नेतृत्व और डिजिटल अधिकार कार्यकर्ताओं के भारी विरोध के बाद अपना निर्देश वापस ले लिया

### Test of necessity

#### आवश्यकता की परीक्षा

- The Hindu's editorial pointed out that the directive would fail the test of **proportionality** the Supreme Court articulated in **K.S. Puttaswamy (2017)** because the same ends can be met by existing portals, USSD codes, and SMS-based checks  
दैनिक पत्र के संपादकीय ने बताया कि यह निर्देश सर्वोच्च न्यायालय द्वारा के एस पुट्टस्वामी (२०१७) में व्यक्त **अनुपातिकता** की कसौटी पर खरा नहीं उतरेगा क्योंकि वही उद्देश्य वर्तमान साधनों, संक्षिप्त कोडों और संदेश आधारित जाँचों से पूरे किए जा सकते हैं
- The app may also fail the test of **necessity** from that judgment  
यह अनुप्रयोग उस निर्णय की **आवश्यकता** की कसौटी पर भी विफल हो सकता है
- (The third test is legality)  
(तीसरी कसौटी विधिकता है)
- Cyber scams, including **digital arrest** frauds and investment schemes, have become more sophisticated everywhere  
डिजिटल छल योजनाएँ, जिनमें **डिजिटल गिरफ्तारी** जैसी ठगी और निवेश संबंधी धोखे शामिल हैं, हर स्थान पर अधिक जटिल हो चुकी हैं
- Interpol estimated that online financial fraud cost victims more than **\$1 trillion** worldwide in **2023**  
अंतरराष्ट्रीय अपराध संस्था का अनुमान है कि २०२३ में ऑनलाइन वित्तीय ठगी ने पीड़ितों को विश्व भर में **एक लाख करोड़ डॉलर** से अधिक का नुकसान पहुँचाया
- But in constitutional terms, "this is a serious problem" is insufficient justification; the state must show that there are no equally effective, less intrusive ways to address that problem  
लेकिन संवैधानिक दृष्टि से "यह एक गंभीर समस्या है" पर्याप्त कारण नहीं है; राज्य को दर्शाना होगा कि इस समस्या के समाधान हेतु कोई समान प्रभावी लेकिन कम हस्तक्षेपकारी उपाय उपलब्ध नहीं है
- However, India already has a telecom spam and fraud reporting system built around the **Sanchar Saathi** and **CEIR** portals, the **TRAI DND** app, and the **1909** short code  
किन्तु भारत के पास पहले से ही **संचार साथी** और **सी ई आई आर** नामक पोर्टलों, **ट्रा.ई.** की अवांछित संदेश रोकने वाली प्रणाली और **१९०९** कोड पर आधारित दूरसंचार ठगी शिकायत व्यवस्था मौजूद है
- The 'DND' app also offers a cautionary tale  
अवांछित संदेश रोकने वाला अनुप्रयोग भी एक चेतावनीपूर्ण उदाहरण प्रस्तुत करता है



- It was designed to read call and SMS logs so that users could report spam  
यह अनुप्रयोग दूरभाष और संदेश विवरण पढ़ने के लिए बनाया गया था ताकि लोग अवांछित संदेशों की शिकायत कर सकें
- Apple refused for years to allow that version into its store, regarding comprehensive access to phone logs as a violation of its privacy policies  
एक विदेशी उपकरण निर्माता ने इसे वर्षों तक अपने भंडार में स्वीकार नहीं किया क्योंकि वह दूरभाष विवरण तक विस्तृत पहुँच को अपनी गोपनीयता नीतियों का उल्लंघन मानता था
- After a compromise, it added system-level tools to report spam and finally approved a narrower version of the app  
समझौते के बाद उसने अवांछित संदेशों की शिकायत करने हेतु प्रणाली स्तर के उपकरण जोड़े और अंततः अनुप्रयोग के सीमित रूप को स्वीकार किया
- The latest mandate recalled the same pattern but on a greater scale  
नवीनतम आदेश ने उसी प्रवृत्ति को दोहराया, किन्तु कहीं बड़े स्तर पर
- A privileged app that sits on almost every smartphone is an attractive target for **overreach** by state agencies as well as by criminal actors who manage to compromise the app itself  
एक विशेष पहुँच वाला अनुप्रयोग जो लगभग हर दूरभाष यंत्र में स्थापित हो, राज्य संस्थाओं द्वारा **अत्यधिक हस्तक्षेप** और आपराधिक तत्वों द्वारा अनुप्रयोग के दुरुपयोग का आकर्षक माध्यम बन जाता है
- Cybersecurity research has repeatedly shown that once attackers obtain a foothold within a widely deployed system component, they can move laterally at scale  
सुरक्षा संबंधी शोध बार-बार दर्शाता है कि किसी व्यापक प्रणाली के घटक में प्रवेश मिलते ही हमलावर बड़े पैमाने पर फैल सकते हैं
- The problem was exacerbated by the fact that existing technologies can check device authenticity in more narrow ways accessed only on demand, and without persisting in the background  
समस्या इसलिए और बढ़ गई क्योंकि वर्तमान तकनीकें उपकरण की प्रामाणिकता को संकीर्ण और केवल आवश्यकता पड़ने पर जाँचना संभव बनाती हैं तथा पृष्ठभूमि में स्थायी रूप से सक्रिय नहीं रहतीं
- Importantly, blanket mandates are also cynical  
महत्वपूर्ण रूप से, सर्वव्यापी आदेश भी हानिकारक सिद्ध होते हैं
- Digital scammers succeed not when they steal money or credentials but when they create **fear** and a sense of **false authority** in a user's mind  
डिजिटल ठग तब सफल होते हैं जब वे धन अथवा पहचान नहीं चुराते बल्कि व्यक्ति के मन में **भय** और **झूठे अधिकार** का आभास उत्पन्न करते हैं
- Changing user behaviour is therefore more desirable than threatening to compromise the digital integrity of individuals and their rights  
अतः व्यक्ति के डिजिटल सम्मान और अधिकारों से समझौते की धमकी देने की अपेक्षा उसके व्यवहार में सुधार लाना अधिक उपयुक्त है
- In Kenya, researchers studying phone-based scams in **2023** developed a measure of "scam identification ability" and tested a gentle intervention based on common tips  
केन्या में दूरभाष आधारित छल योजनाओं का अध्ययन कर रहे शोधकर्ताओं ने **२०२३** में "छल पहचान क्षमता" का एक माप विकसित किया और सामान्य सुझावों पर आधारित एक हल्का हस्तक्षेप जाँचा
- They found generic advice did not improve users' ability to distinguish scams from genuine messages  
उन्होंने पाया कि सामान्य सलाह उपयोगकर्ताओं की छल और वास्तविक संदेशों के बीच अंतर करने की क्षमता में सुधार नहीं करती
- The lesson isn't that behaviour change is irrelevant but that it cannot be adjusted by slogans  
सबक यह नहीं है कि व्यवहार परिवर्तन अप्रासंगिक है बल्कि यह कि उसे केवल नारे देकर बदला नहीं जा सकता
- It has to be continuous, culturally sensitive, tailored to local user behaviours, and compatible with the ways in which telecom providers and state agencies communicate  
यह निरंतर, सांस्कृतिक रूप से संवेदनशील, स्थानीय उपयोगकर्ताओं के व्यवहार के अनुकूल और दूरसंचार प्रदाताओं तथा राज्य संस्थाओं की संवाद प्रणाली के अनुरूप होना चाहिए
- India already has the building blocks for such a mission  
भारत के पास पहले से ही ऐसे प्रयास के आधारभूत तत्व मौजूद हैं
- The **Reserve Bank of India** has long run e-BAAT sessions and other outreach programmes on safe digital banking, warning users to not share PINs, passwords, and OTPs and



explaining typical fraud scripts

**भारतीय रिज़र्व बैंक** लंबे समय से सुरक्षित डिजिटल बैंकिंग पर ई-बात सत्र और अन्य जागरूकता कार्यक्रम चलाता रहा है, जिसमें उपयोगकर्ताओं को अपने गोपनीय अंकों, गुप्त शब्दों तथा एक बार उपयोग संकेतों को साझा न करने की चेतावनी दी जाती है और सामान्य ठगी तरीकों की व्याख्या की जाती है

- The '**RBI Kehta Hai**' campaign has taken these messages to mass media and digital platforms with a focus on responsible banking and fraud prevention  
**आरबीआई कहता है** अभियान ने इन संदेशों को जन संचार माध्यमों और डिजिटल मंचों तक पहुँचाया है जिसमें जिम्मेदार बैंकिंग और ठगी रोकथाम पर ध्यान दिया गया है
- In Chhattisgarh, a cybersecurity awareness van, backed by the State government and a public sector bank, has been touring districts with street plays and demonstrations and promotes the national **1930** helpline to report financial cybercrime  
छत्तीसगढ़ में राज्य सरकार और एक लोक क्षेत्रीय बैंक द्वारा समर्थित एक साइबर सुरक्षा जागरूकता वाहन ज़िलों में नुक्कड़ नाटक और प्रदर्शन कर रहा है तथा वित्तीय साइबर अपराध की शिकायत हेतु राष्ट्रीय **१९३०** सहायतांक का प्रचार करता है
- Telangana's new '**Fraud Ka Full Stop**' campaign combines bank customer programmes and district events to already report an **8%** decline in cybercrime  
तेलंगाना के नए **फ्रॉड का फुल स्टॉप** अभियान ने बैंक ग्राहक कार्यक्रमों और ज़िला स्तरीय आयोजनों को जोड़कर साइबर अपराध में **८%** की गिरावट दर्ज की है
- Banks and local police in cities such as Tiruchi in Tamil Nadu have used mobile kiosks and public sessions to turn branches into informal cybersafety workshops  
तमिलनाडु के तिरुचि जैसे नगरों में बैंकों और स्थानीय पुलिस ने मोबाइल कियोस्क और सार्वजनिक सत्रों का उपयोग कर शाखाओं को अनौपचारिक साइबर सुरक्षा कार्यशालाओं में बदल दिया है
- Approaches like these offer two long-term advantages  
ऐसे प्रयास दो दीर्घकालिक लाभ प्रदान करते हैं
- First, an individual who has learned to distrust unsolicited links and callers and use official helplines is more digitally literate and less vulnerable to digital scams  
पहला, वह व्यक्ति जिसने अनचाहे संयोजनों और अज्ञात कॉल करने वालों पर अविश्वास करना तथा सरकारी सहायतांक का उपयोग करना सीख लिया है, अधिक डिजिटल रूप से सक्षम और ठगी के प्रति कम संवेदनशील होता है
- Second, they reduce the need for repeated state intervention in the application layer and free regulators up to focus on systemic measures such as improving the traceability of large-value flows  
दूसरा, ये प्रयास अनुप्रयोग स्तर पर बार-बार राज्य हस्तक्षेप की आवश्यकता घटाते हैं और नियामकों को बड़े मूल्य प्रवाह की अनुरेखण क्षमता सुधारने जैसे तंत्रगत उपायों पर ध्यान केंद्रित करने की स्वतंत्रता देते हैं

### Three pillars तीन स्तंभ

- The state's focus should shift away from "what's there to hide?" to a combination of "what's there to see?" and a mission to improve digital literacy  
राज्य का ध्यान "छिपाने को क्या है?" से हटकर "देखने को क्या है?" और डिजिटल साक्षरता सुधारने के अभियान पर केंद्रित होना चाहिए
- Such a mission should rest on three pillars  
ऐसा अभियान तीन स्तंभों पर आधारित होना चाहिए
- Obligations on telecom and financial firms to detect and disrupt fraud patterns  
दूरसंचार और वित्तीय संस्थाओं पर छल की प्रवृत्तियों पहचानने और उन्हें रोकने का दायित्व होना चाहिए
- Functional user reporting and redress mechanisms  
उपयोगकर्ताओं के लिए कार्यशील शिकायत और निवारण व्यवस्था होनी चाहिए
- And a sustained public education programme on digital risks that doesn't treat citizens as passive subjects  
और डिजिटल जोखिमों पर एक सतत जन शिक्षा कार्यक्रम होना चाहिए जो नागरिकों को निष्क्रिय प्रजा के रूप में न देखे



# What are concerns over the draft ISI Bill, 2025?

Why did the Ministry of Statistics and Programme Implementation release the draft Indian Statistical Institute Bill, 2025, repealing the Indian Statistical Institute Act, 1959? Why are students and academicians protesting? How will it affect the revenue generating mechanisms of the institute?

CS III: S&T

EXPLAINER

Shiv Sahay Singh

The story so far:

On September 25, the Ministry of Statistics and Programme Implementation (MoSPI) released the draft Indian Statistical Institute Bill, 2025. The Bill has been met with strong protests by academicians as well as students of the Indian Statistical Institute (ISI) who claim that the move is aimed to strip the institute of its academic autonomy by converting it from a "registered society to a statutory body corporate".

**What is the significance of the ISI?**  
The ISI was founded in December 1931 by P.C. Mahalanobis in Kolkata and has since grown into one of India's most prestigious academic and research institutions. The institute was originally registered in April 1932, under the Societies Registration Act of 1860, and later re-registered under the West Bengal Societies Registration Act of 1961. Being a society provided the institute its own memorandum of association, bye-laws, and regulations. Parliament enacted the Indian Statistical Institute Act, 1959, declaring ISI as an Institution of National Importance (INI). Many scholars link the origin of the institute to the Bengal renaissance and credit the institute with shaping India's planning and policy apparatus. The National Sample Survey Organisation (NSSO) was developed at ISI, establishing the foundation of India's official statistical system. Other than P.C. Mahalanobis, the institute has produced legendary scholars such as Professor C.R. Rao and S.R.S. Varadhan.

With about 1,200 students and six centres across India, ISI offers undergraduate and postgraduate degrees in Statistics, Mathematics, Quantitative Economics, Computer Science, Library and Information Science, Cryptology and Security, Quality Management Science

MOB



Major changes: The Kolkata-based Indian Statistical Institute. FILE PHOTO

and Operations Research.

**Why are academicians protesting?**  
The primary concern of those opposing the draft Bill is how the ISI's institutional status will change, from a "a registered society to a statutory body corporate". A recent letter by about 1,500 academicians to Rao Inderjit Singh, Minister of State (Independent Charge) MoSPI, stated that there is no transparent reason that MoSPI should repeal the (1959) Act, abolish the society and introduce a Bill which violates the basic spirit of the agreement between the general body of the society and the government. The letter also states that the move to bypass the society registered under the WB Societies Registration Act to a "statutory body corporate" infringes upon the jurisdiction of the Societies Registration Act and is against the spirit of

immediate results may not be visible. Since there is a push for a corporate model of funding in the draft Bill, getting funds for basic research projects could be a problem in the future. Section 29 of the proposed 2025 Act deals with 'power to generate revenue' which includes student fees, consultancy services and sponsored research projects among others. Another critical area raised by those opposing the Bill is that all appointments will be controlled by the Union government, through the BoG. Earlier there were 10 representatives from ISI (eight elected, one worker and one scientific worker) out of the 33 representatives on the council, a little less than one-third. Now there will be none. Professor Sarkar said that after the proposed Bill, there are apprehensions of political interference in the appointments by the Union Government.

**What is the government saying?**  
The government claims that the idea behind the legislation is the vision to make ISI not only one of the best in India but one of the foremost institutes in the world as the institute approaches its centenary in 2031. A press release stated that, over the years, four review committees had examined the functioning of ISI. The most recent, chaired by Dr. R.A. Mashelkar in 2020, recommended major reforms to strengthen governance, expand academic programmes, and make ISI globally competitive.

**What lies ahead?**  
The students and academicians are banking on the support of Opposition parties to oppose the proposed legislation. Villupuram Member of Parliament D. Ravikumar has written to the Union Minister of State (MoPSI) urging him to withdraw the draft Indian Statistical Institute Bill, 2025. Leaders from Trinamool Congress and Communist Party of India (Marxist) have also publicly opposed the draft legislation and vowed to oppose it if it is tabled in Parliament.

THE GIST

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▼ The government claims that the idea behind the legislation is the vision to make ISI not only one of the best in India but one of the foremost institutes in the world as the institute approaches its centenary in 2031.

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## What are concerns over the draft ISI Bill, 2025? ड्राफ्ट आईएसआई विधेयक, 2025 को लेकर क्या चिंताएँ हैं?

### Indian Statistical Institute Bill, 2025 भारतीय सांख्यिकीय संस्थान विधेयक, 2025

- On September 25, the Ministry of Statistics and Programme Implementation (MoSPI) released the draft Indian Statistical Institute Bill, 2025.  
२५ सितम्बर को सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय ने भारतीय सांख्यिकीय संस्थान विधेयक, २०२५ का मसौदा जारी किया।
- The Bill has been met with strong protests by academicians as well as students of the Indian Statistical Institute (ISI) who claim that the move is aimed to strip the institute of its academic autonomy by converting it from a "registered society to a statutory body corporate".  
इस विधेयक का तीव्र विरोध शिक्षाविदों तथा भारतीय सांख्यिकीय संस्थान के विद्यार्थियों द्वारा किया गया है, जो दावा करते हैं कि यह कदम संस्थान को "पंजीकृत समाज से वैधानिक निकाय" में बदलकर उसकी शैक्षणिक स्वायत्तता समाप्त करने के उद्देश्य से है।

### What is the significance of the ISI? भारतीय सांख्यिकीय संस्थान का महत्व क्या है?

- The ISI was founded in December 1931 by P.C. Mahalanobis in Kolkata and has since grown into one of India's most prestigious academic and research institutions.  
भारतीय सांख्यिकीय संस्थान की स्थापना दिसम्बर १९३१ में पी. सी. महालनोबिस द्वारा कोलकाता में की गई थी और यह भारत के प्रतिष्ठित शैक्षणिक और अनुसंधान संस्थानों में से एक बन गया है।



- The institute was originally registered in April 1932, under the Societies Registration Act of 1860, and later re-registered under the West Bengal Societies Registration Act of 1961.  
संस्थान को मूल रूप से अप्रैल १९३२ में समाज पंजीकरण अधिनियम १८६० के अंतर्गत पंजीकृत किया गया था और बाद में इसे १९६१ के पश्चिम बंगाल समाज पंजीकरण अधिनियम के अंतर्गत पुनः पंजीकृत किया गया।
- Being a society provided the institute its own memorandum of association, bye-laws, and regulations.  
समाज होने के कारण संस्थान को अपना स्मारक-पत्र, उप-नियम और विनियम प्राप्त थे।
- Parliament enacted the Indian Statistical Institute Act, 1959, declaring ISI as an Institution of National Importance (INI).  
संसद ने भारतीय सांख्यिकीय संस्थान अधिनियम, १९५९ पारित किया जिससे संस्थान को राष्ट्रीय महत्व का संस्थान घोषित किया गया।
- Many scholars link the origin of the institute to the Bengal renaissance and credit the institute with shaping India's planning and policy apparatus.  
कई विद्वान संस्थान की उत्पत्ति को बंगाल पुनर्जागरण से जोड़ते हैं और भारत की योजना और नीतिगत संरचना के निर्माण का श्रेय इस संस्थान को देते हैं।
- The National Sample Survey Organisation (NSSO) was developed at ISI, establishing the foundation of India's official statistical system.  
राष्ट्रीय नमूना सर्वेक्षण संगठन का विकास इसी संस्थान में हुआ, जिसने भारत की आधिकारिक सांख्यिकीय प्रणाली की नींव रखी।
- Other than P.C. Mahalanobis, the institute has produced legendary scholars such as Professor C.R. Rao and S.R.S. Varadhan.  
पी. सी. महालनोबिस के अतिरिक्त, संस्थान ने सी. आर. राव तथा एस. आर. एस. वरधान जैसे महान विद्वान उत्पन्न किए हैं।
- With about 1,200 students and six centres across India, ISI offers undergraduate and postgraduate degrees in many disciplines such as Statistics, Mathematics, Quantitative Economics, Computer Science, Library and Information Science, Cryptology and Security, Quality Management Science and Operations Research.  
लगभग १,२०० विद्यार्थियों और देशभर में छः केंद्रों के साथ संस्थान सांख्यिकी, गणित, परिमाणात्मक अर्थशास्त्र, संगणक विज्ञान, पुस्तकालय एवं सूचना विज्ञान, कूटलेखन एवं सुरक्षा, गुणवत्ता प्रबंधन विज्ञान और परिचालन अनुसंधान में स्नातक एवं स्नातकोत्तर उपाधियाँ प्रदान करता है।

### Why are academicians protesting?

#### शिक्षाविद विरोध क्यों कर रहे हैं?

- The primary concern of those opposing the draft Bill is how the ISI's institutional status will change, from a "registered society to a statutory body corporate".  
विरोध करने वालों की मुख्य चिंता यह है कि संस्थान की स्थिति "पंजीकृत समाज से वैधानिक निकाय" में बदल जाएगी।
- A recent letter by about 1,500 academicians to Rao Inderjit Singh stated that there is no transparent reason that MoSPI should repeal the 1959 Act, abolish the society and introduce a Bill which violates the basic spirit of the agreement.  
हाल ही में लगभग १,५०० शिक्षाविदों द्वारा राव इंद्रजीत सिंह को लिखे गए पत्र में कहा गया कि १९५९ अधिनियम को निरस्त करने, समाज को समाप्त करने और समझौते की भावना का उल्लंघन करने वाले विधेयक को लाने का कोई पारदर्शी कारण नहीं है।
- The letter also states that the move to bypass the society registered under the WB Societies Registration Act violates the jurisdiction of the Act and is against cooperative federalism.  
पत्र में यह भी कहा गया है कि पश्चिम बंगाल समाज पंजीकरण अधिनियम के अंतर्गत पंजीकृत समाज को दरकिनार करना अधिनियम के अधिकार क्षेत्र का उल्लंघन है तथा सहकारी संघवाद की भावना के विपरीत है।
- On November 28, hundreds of students and staff of ISI formed a human chain and held a public meeting near the institute's campus on B.T. Road in North Kolkata.  
२८ नवम्बर को भारतीय सांख्यिकीय संस्थान के सैकड़ों विद्यार्थी और कर्मचारी उत्तरी कोलकाता में बी. टी. रोड पर स्थित परिसर के निकट मानव श्रृंखला बनाकर सार्वजनिक बैठक आयोजित की।

### Concerns about Governance Changes in the ISI Bill, 2025 भारतीय सांख्यिकीय संस्थान विधेयक, २०२५ में शासन संबंधी चिंताएँ



- Those opposing the draft Bill point out that the governance structure, as in the existing 1959 Act, vested authority in a council with academic representation, and procedural safeguards against government overreach.  
विधेयक का विरोध करने वाले यह इंगित करते हैं कि वर्तमान १९५९ अधिनियम में शासन संरचना में अधिकार एक ऐसे परिषद में निहित थे जिसमें शैक्षणिक प्रतिनिधित्व था और सरकारी हस्तक्षेप से बचाव के लिए प्रक्रिया-संबंधी सुरक्षा प्रावधान मौजूद थे।
- The proposed 2025 Bill, however, gives power to the Board of Governors (BoG), defined under Section 15 of the Act, which is heavily dominated by government nominees sidelining the authority of faculty and academic stakeholders.  
परंतु प्रस्तावित २०२५ विधेयक अधिनियम की धारा १५ के अंतर्गत परिभाषित **गवर्नरों के बोर्ड** को शक्ति प्रदान करता है, जो सरकारी नामांकित व्यक्तियों द्वारा अत्यधिक नियंत्रित होगा और इससे शिक्षकों तथा शैक्षणिक हितधारकों की अधिकारिता कमजोर हो जाएगी।
- Former professor of ISI and chairman of West Bengal Infrastructure Development Finance Corporation Abhirup Sarkar said that the ISI is a place of doing basic research which is a long-term process where immediate results may not be visible.  
भारतीय सांख्यिकीय संस्थान के पूर्व प्राध्यापक तथा पश्चिम बंगाल अवसंरचना विकास वित्त निगम के अध्यक्ष **अभिरूप सरकार** ने कहा कि यह संस्थान **मौलिक शोध** का केंद्र है जो दीर्घकालिक प्रक्रिया होती है, जिसमें त्वरित परिणाम प्रायः दिखाई नहीं देते।
- Since there is a push for a corporate model of funding in the draft Bill, getting funds for basic research projects could be a problem in the future.  
चूंकि मसौदा विधेयक में वित्तपोषण के **निगमित मॉडल** की ओर झुकाव है, इसलिए भविष्य में मौलिक शोध परियोजनाओं के लिए धन प्राप्त करना एक समस्या बन सकता है।
- Section 29 of the proposed 2025 Act deals with 'power to generate revenue' which includes student fees, consultancy services and sponsored research projects among others.  
प्रस्तावित २०२५ अधिनियम की धारा २९ 'राजस्व उत्पन्न करने की शक्ति' से संबंधित है, जिसमें छात्र शुल्क, परामर्श सेवाएँ तथा प्रायोजित शोध परियोजनाएँ आदि शामिल हैं।
- Another critical area raised by those opposing the Bill is that all appointments will be controlled by the Union government, through the BoG.  
विधेयक का विरोध करने वालों द्वारा उठाया गया एक अन्य महत्वपूर्ण मुद्दा यह है कि सभी नियुक्तियाँ **गवर्नरों के बोर्ड** के माध्यम से **केंद्र सरकार** द्वारा नियंत्रित की जाएँगी।
- Earlier there were 10 representatives from ISI (eight elected, one worker and one scientific worker) out of the 33 representatives on the council, a little less than one-third. Now there will be none.  
पहले परिषद में कुल ३३ में से १० प्रतिनिधि संस्थान से होते थे (आठ निर्वाचित, एक कर्मचारी और एक वैज्ञानिक कर्मचारी), जो एक-तिहाई से थोड़ा कम था। अब इनकी संख्या **शून्य** हो जाएगी।
- Professor Sarkar said that after the proposed Bill, there are apprehensions of political interference in the appointments by the Union Government.  
प्राध्यापक सरकार ने कहा कि प्रस्तावित विधेयक के बाद **केंद्र सरकार** द्वारा नियुक्तियों में **राजनीतिक हस्तक्षेप** की आशंका है।

### What is the government saying?

#### सरकार क्या कह रही है?

- The government claims that the idea behind the legislation is the vision to make ISI not only one of the best in India but one of the foremost institutes in the world as the institute approaches its centenary in 2031.  
सरकार का दावा है कि इस विधेयक का उद्देश्य भारतीय सांख्यिकीय संस्थान को **२०३१ में अपने शताब्दी वर्ष** के अवसर पर न केवल भारत में श्रेष्ठ बनाना है बल्कि विश्व के अग्रणी संस्थानों में शामिल करना है।
- A press release stated that, over the years, four review committees had examined the functioning of ISI.  
एक प्रेस विज्ञप्ति में कहा गया कि वर्षों के दौरान संस्थान के कार्यप्रणाली की समीक्षा के लिए **चार समितियाँ** गठित की गई थीं।
- The most recent, chaired by Dr. R.A. Mashelkar in 2020, recommended major reforms to strengthen governance, expand academic programmes, and make ISI globally competitive.  
सबसे हालिया समिति, जिसका अध्यक्षता **डॉ. आर. ए. माशेलकर** ने २०२० में की थी, ने शासन सुदृढ़ करने,



शैक्षणिक कार्यक्रमों का विस्तार करने तथा संस्थान को वैश्विक प्रतिस्पर्धा के योग्य बनाने हेतु महत्वपूर्ण सुधारों की सिफारिश की थी।

### What lies ahead?

#### आगे क्या होगा?

- The students and academicians are banking on the support of Opposition parties to oppose the proposed legislation.  
विद्यार्थी तथा शिक्षाविद प्रस्तावित विधेयक का विरोध करने के लिए **विपक्षी दलों** के समर्थन पर निर्भर हैं।
- Villupuram Member of Parliament D. Ravikumar has written to the Union Minister of State (MoPSI) urging him to withdraw the draft Indian Statistical Institute Bill, 2025.  
**विल्लुपुरम** से सांसद **डी. रविकुमार** ने केंद्रीय राज्यमंत्री को पत्र लिखकर **भारतीय सांख्यिकीय संस्थान विधेयक, २०२५** का मसौदा वापस लेने का आग्रह किया है।
- Leaders from Trinamool Congress and Communist Party of India (Marxist) have also publicly opposed the draft legislation and vowed to oppose it if it is tabled in Parliament.  
**तृणमूल कांग्रेस** और **भारतीय कम्युनिस्ट पार्टी (मार्क्सवादी)** के नेताओं ने भी इस विधेयक का सार्वजनिक रूप से विरोध किया है और संसद में प्रस्तुत होने पर इसका विरोध करने की प्रतिज्ञा व्यक्त की है।

### GS Paper III: Environment

#### TOPICS COVERED

08\_12\_2025

1.

**Top agricultural research body urges varsities to start courses in natural farming**  
शीर्ष कृषि अनुसंधान संस्था ने विश्वविद्यालयों से प्राकृतिक कृषि में पाठ्यक्रम शुरू करने का आग्रह किया

2.

**Grassland soils, not trees, anchor India's climate resilience**  
घासभूमि की मिट्टी, पेड़ नहीं, भारत की जलवायु लचीलापन को मजबूत करती है



# Top agricultural research body urges varsities to start courses in natural farming

GS III: Environment

The Hindu Bureau

NEW DELHI

Indian Council of Agricultural Research (ICAR) Director-General M.L. Jat has written to the Vice-Chancellors of all State and Central agriculture universities, as well as universities with agriculture departments, urging them to launch undergraduate and postgraduate courses and research programmes in natural farming.

Though natural farming was already offered as an elective subject in various institutions and four universities had dedicated courses on the subject, it is the first time that the ICAR has urged all affiliated colleges and State government institutions to introduce courses on the topic.

**Natural farming has emerged as a subject of national importance, says ICAR D-G**

In the letter, Dr. Jat said natural farming had emerged as a subject of national importance, aligned with India's strategic priorities for sustainable agriculture and farmer welfare. He said the B.Sc. (Hons.) agriculture - natural farming programme, developed as per the Sixth Deans' Committee recommendations and National Education Policy (NEP) 2020 guidelines, has already been finalised, approved, and circulated to all agricultural universities. "Some universities have

successfully initiated this programme from the academic year 2023-24, marking a transformative milestone in agricultural higher education. I hope remaining universities will introduce this course by next academic year," he said.

On strengthening postgraduate education and advanced research on the subject, he said that given the expanding national demand for chemical-free food systems, resilient agro-ecosystems, soil health restoration, and low-emission farming, it was imperative that the State agricultural universities, deemed universities, and Central agricultural universities develop PG programmes in natural farming and allied domains.

## Top agricultural research body urges varsities to start courses in natural farming

शीर्ष कृषि अनुसंधान संस्था ने विश्वविद्यालयों से प्राकृतिक कृषि में पाठ्यक्रम शुरू करने का आग्रह किया

- **Indian Council of Agricultural Research (ICAR) Director-General M.L. Jat** has written to the Vice-Chancellors of all **State and Central agriculture universities**, as well as universities with **agriculture departments**, urging them to launch **undergraduate and postgraduate courses** and **research programmes** in **natural farming**.  
भारतीय कृषि अनुसंधान परिषद (ICAR) के महानिदेशक एम.एल. जाट ने सभी राज्य और केंद्रीय कृषि विश्वविद्यालयों के कुलपतियों और कृषि विभाग वाले विश्वविद्यालयों को पत्र लिखा, जिसमें उन्हें प्राकृतिक कृषि में स्नातक और स्नातकोत्तर पाठ्यक्रम और अनुसंधान कार्यक्रम शुरू करने का आग्रह किया।
- Though **natural farming** was already offered as an **elective subject** in various institutions and **four universities** had dedicated courses on the subject, it is the first time that the ICAR has urged all **affiliated colleges** and **State government institutions** to introduce courses on the topic.  
हालांकि प्राकृतिक कृषि को पहले ही विभिन्न संस्थानों में वैकल्पिक विषय के रूप में पेश किया गया था और चार विश्वविद्यालयों में इस विषय पर विशेष पाठ्यक्रम थे, यह पहली बार है कि ICAR ने सभी संलग्न कॉलेजों और राज्य सरकारी संस्थानों से इस विषय पर पाठ्यक्रम शुरू करने का आग्रह किया है।
- In the letter, **Dr. Jat** said **natural farming** had emerged as a **subject of national importance**, aligned with India's strategic priorities for **sustainable agriculture** and **farmer welfare**.



पत्र में, डॉ. जाट ने कहा कि प्राकृतिक कृषि एक राष्ट्रीय महत्व का विषय बन गया है, जो भारत की सतत कृषि और किसान कल्याण की रणनीतिक प्राथमिकताओं के अनुरूप है।

- He said the **B.Sc. (Hons.) agriculture - natural farming programme**, developed as per the **Sixth Deans' Committee recommendations** and **National Education Policy (NEP) 2020 guidelines**, has already been finalised, approved, and circulated to all agricultural universities.

उन्होंने कहा कि **B.Sc. (Hons.) कृषि - प्राकृतिक कृषि कार्यक्रम**, जिसे **छठी डीन समिति की सिफारिशों** और **राष्ट्रीय शिक्षा नीति (NEP) 2020 दिशानिर्देशों** के अनुसार विकसित किया गया है, पहले ही अंतिम रूप दे दिया गया है, अनुमोदित किया गया है, और सभी कृषि विश्वविद्यालयों में वितरित किया गया है।

- "Some universities have successfully initiated this programme from the academic year 2023-24, marking a **transformative milestone in agricultural higher education**. I hope remaining universities will introduce this course by next academic year," he said.

"कुछ विश्वविद्यालयों ने इस कार्यक्रम को **शैक्षणिक वर्ष 2023-24** से सफलतापूर्वक शुरू कर दिया है, जो **कृषि उच्च शिक्षा** में एक **परिवर्तनकारी मील का पत्थर** है। मुझे आशा है कि शेष विश्वविद्यालय अगले शैक्षणिक वर्ष तक इस पाठ्यक्रम को शुरू करेंगे," उन्होंने कहा।

- On strengthening **postgraduate education** and **advanced research** on the subject, he said that given the expanding national demand for **chemical-free food systems, resilient agro-ecosystems, soil health restoration, and low-emission farming**, it was imperative that the **State agricultural universities, deemed universities, and Central agricultural universities** develop **PG programmes in natural farming** and allied domains.

इस विषय में **स्नातकोत्तर शिक्षा** और **उन्नत अनुसंधान** को मजबूत करने के संबंध में, उन्होंने कहा कि **रासायनिक-मुक्त खाद्य प्रणाली, लचीले कृषि-परिसर, मिट्टी स्वास्थ्य पुनर्स्थापना, और कम-उत्सर्जन कृषि** की बढ़ती राष्ट्रीय मांग को देखते हुए, यह आवश्यक है कि **राज्य कृषि विश्वविद्यालय, मान्यता प्राप्त विश्वविद्यालय, और केंद्रीय कृषि विश्वविद्यालय प्राकृतिक कृषि** और संबंधित क्षेत्रों में **स्नातकोत्तर कार्यक्रम** विकसित करें।



# Grassland soils, not trees, anchor India's climate resilience

Grasslands play a crucial role in the building and maintaining of healthy soils, primarily through their deep, fibrous root systems that stabilise the ground, enhance soil structure, and promote the storage of carbon; unlike forests, where most biomass is above ground, grassland productivity is concentrated below at root level

## Environment

Tushar Pathade  
Abi T. Vanak

**“W**astelands”. That’s how India’s biodiverse semi-arid grasslands and savannahs have been undervalued ever since the British colonial era. For the masters, the woody forests of the subcontinent fuelled industrialisation, while the grassy biomes served no purpose in their timber-driven colonisation.

Much of post-independence policy and jurisprudence drew heavily from the erstwhile rulers and “wastelands” made their way into land records and government policy. In 1985, a National Wastelands Development Board was created to bring a more scientific basis “to identify, classify and develop the wastelands” towards more productive uses. Ravines, scrub lands, degraded scrub forests, degraded pastures, grazing lands, barren rocky areas, glaciers and snow-covered mountains, along with mining or industrial wasteland and degraded plantation land, were all classified as wastelands.

For decades, studies have shown that far from being a wasteland, these savannah grasslands are flourishing ecosystems that not only harbour unique biodiversity but also provide livelihoods to millions of pastoral communities. Take Maharashtra, for instance. The State’s livestock economy was valued at over ₹59,000 crore (US\$ 9.5 billion) in 2018-2019, and that’s just one year.

### What lies beneath

Grasslands play a crucial role in building and maintaining healthy soils, primarily through their deep, fibrous root systems that stabilise the ground, enhance soil structure, and promote long-term carbon storage. Unlike forests, where most biomass is above ground, grassland productivity is concentrated below ground, creating dense root mats that improve water infiltration, reduce erosion, and buffer soils against drought. These roots continually deposit organic matter, enriching soils with stable carbon compounds that can persist for centuries. Grassland soils also support diverse microbial and fungal communities that drive nutrient cycling and maintain soil fertility. When grasslands are degraded, converted, or afforested, these below-ground processes are disrupted, leading to compaction, erosion, loss of soil organic carbon, and reduced ecosystem resilience.



Savannahs and scrubland provide livelihoods to millions of pastoralists. HARSHA VADLAMANI

As the climate crisis worsened, the importance of carbon sequestration in ecosystems moved to the forefront of global discussions. Research began pouring in from around the world, showing that grasslands hold enormous potential for carbon sequestration. Thus, in addition to their role as an abode of diverse wildlife and their socio-economic importance, we now know that grasslands store a huge amount of below-ground carbon, which remains undisturbed even by fire. A pioneering initiative in Solapur’s semi-arid grasslands signalled a shift in the Maharashtra State forest department’s perception of these ecosystems. The Compensatory Afforestation Fund Management and Planning Authority (CAMPA) which manages funds collected for the conversion of forest land to non-forest for developmental works, decided to use a part of this for restoring degraded grasslands.

CAMPA authority of the Maharashtra forest department restored degraded patches of grassland in the Malshiras forest range of Solapur district over several years. Native grasses such as *Dicanthium annulatum*, *Chrysopogon fibrus* and *Cenchrus setigerus* were raised in a nursery and then later planted in situ after the first monsoon showers.

Subsequently, a study was conducted by researchers from Ashoka Trust for Research in Ecology and Environment, Bengaluru and The Grasslands Trust, in partnership with the forest department to understand the impacts of these restoration activities on soil, including

**After two years, the restored sites showed an increase of 21% SOC compared to the untreated site, and a massive 50% more than the untreated site by the third year. These findings highlight how grassland restoration paves the way for India to meet its climate goals**

carbon sequestration. This study compared restored plots of different ages (one, two and three years) to an unrestored site, and to an undisturbed old-growth grassland. The study revealed that the restored grasslands showed a significant increase in the soil organic carbon (SOC) at the treatment sites compared to the control sites.

After two years, the restored sites showed an increase of 21% SOC compared to the untreated site, and a massive 50% greater than the untreated by the third year. These findings highlight how grassland restoration from the CAMPA funds paves the way for India to meet its climate goals.

Another recently published study by researchers at ATREE has documented the remarkable carbon sequestration potential of the Banni Grassland in the Kutch district of Gujarat. Once celebrated as the largest tropical grassland in Asia, Banni suffered decades of policy missteps that promoted large-scale planting of the invasive mesquite (*Neluma juliflora*). This rapidly transformed vast open savannahs

into dense, impenetrable thickets, degrading both ecology and pastoral livelihoods. The study reveals a striking pattern: restored grassland patches, locally known as *wada*, store the highest levels of soil organic carbon (SOC), followed by wetlands and dense woodlands. The lowest SOC values were found in mixed woodland stands and saline grasslands. What makes Banni especially noteworthy is that these restored patches were revived by the community itself, first by removing *Prosopis* and allowing native perennial grasses to regenerate

### Carbon-rich and arid

The Maldhari pastoralists manage these areas through rotational grazing, controlled harvest of standing biomass, and careful monitoring of grass recovery. Across its four major land-use types, Banni stores 27 metric tonnes of carbon up to 30 cm soil depth, with an average SOC density of around 120 tonnes of carbon per hectare. This places Banni among the most carbon-rich arid ecosystems globally, demonstrating that healthy grasslands, not invasive trees, underpin true climate resilience in drylands.

Banni also shows the way forward: restoring native grasses, removing invasive woody cover, and placing pastoralist communities at the centre of governance. Participatory, community-led grassland management is not just a restoration method—it is the restoration outcome. The Intergovernmental Panel on Climate Change reminds us that soils hold twice as much carbon as the atmosphere and all living biomass combined. In an era of rising temperatures and more frequent forest fires, the relative stability of SOC in grasslands—protected beneath the soil surface—is an advantage we urgently need to recognise.

Banni and Malshiras teach us a profound lesson: our strongest climate solutions lie beneath our feet. The deep roots of native grasses have been storing carbon for millennia, long before the word “sequestration” entered our vocabulary. India’s climate-resilient future will not be achieved merely by planting trees; in many places, especially in our drylands, it will come from restoring ecosystems where the soil still remembers how to breathe.

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## THE GIST

Far from being wastelands, grasslands are flourishing ecosystems that not only harbour biodiversity but also provide livelihoods to millions of pastoral communities; in Maharashtra, the livestock economy was valued at ₹59,000 crore in 2018-2019

Grasslands hold enormous potential for carbon sequestration; in addition to being an abode for wildlife, and their socio-economic importance, we now know that grasslands store a huge amount of below-ground carbon, which remains undisturbed even by fire

The Banni Grassland stores 27 metric tonnes of carbon up to 30 cm in depth, with an average SOC density of 120 tonnes of carbon per hectare; this makes it among the most carbon-rich arid ecosystems globally, demonstrating that grasslands, not trees, underpin true climate resilience

## Grassland soils, not trees, anchor India's climate resilience

घासभूमि की मिट्टी, पेड़ नहीं, भारत की जलवायु लचीलापन को मजबूत करती है

- Grasslands play a crucial role in the building and maintaining of healthy soils, primarily through their deep, **fibrous root systems** that stabilise the ground, enhance soil structure, and promote the storage of **carbon**; unlike forests, where most biomass is above ground, grassland productivity is concentrated below at **root level**

घासभूमियाँ स्वस्थ मिट्टी के निर्माण और संरक्षण में महत्वपूर्ण भूमिका निभाती हैं, मुख्यतः अपनी गहरी **रेशदार जड़ प्रणालियों** के माध्यम से जो भूमि को स्थिर करती हैं, मिट्टी की संरचना को बेहतर बनाती हैं और **कार्बन** के भंडारण को बढ़ावा देती हैं; वनों के विपरीत, जहाँ अधिकांश बायोमास भूमि के ऊपर होता है, घासभूमि की उत्पादकता नीचे **जड़ स्तर** पर केंद्रित होती है

“Wastelands”  
“वेस्टलैंड्स”



- “Wastelands”. That’s how India’s biodiverse semi-arid grasslands and savannahs have been undervalued ever since the British colonial era.  
“वेस्टलैंड्स”. यही वह तरीका है जिससे भारत के जैव-विविध अर्ध-शुष्क घासभूमियों और सवाना को ब्रिटिश औपनिवेशिक युग से कम करके आँका गया है।
- For the masters, the woody forests of the subcontinent fuelled industrialisation, while the grassy biomes served no purpose in their timber-driven colonisation.  
शासकों के लिए, उपमहाद्वीप के वनाच्छादित जंगलों ने औद्योगीकरण को ईंधन दिया, जबकि घासभूमि बायोम उनकी टिम्बर-चालित उपनिवेशवाद में बेकार मानी गई।
- Much of post-independence policy and jurisprudence drew heavily from the erstwhile rulers and “wastelands” made their way into land records and government policy.  
स्वतंत्रता के बाद की अधिकांश नीतियाँ और न्याय-शास्त्र पूर्व शासकों से गहराई से प्रभावित हुए और “वेस्टलैंड्स” भूमि अभिलेखों व सरकारी नीतियों में शामिल हो गए।
- In 1985, a **National Wastelands Development Board** was created to bring a more scientific basis “to identify, classify and develop the wastelands” towards more productive uses.  
1985 में, एक **नेशनल वेस्टलैंड्स डेवलपमेंट बोर्ड** बनाया गया ताकि “वेस्टलैंड्स की पहचान, वर्गीकरण और विकास” को अधिक उत्पादक उपयोगों की ओर वैज्ञानिक आधार दिया जा सके।
- Ravines, scrub lands, degraded scrub forests, degraded pastures, grazing lands, barren rocky areas, glaciers and snow-covered mountains, along with mining or industrial wasteland and degraded plantation land, were all classified as wastelands.  
खड्ड, झाड़ी भूमि, अपक्षयित झाड़ी वन, अपक्षयित चारागाह, चराई भूमि, बंजर पथरीले क्षेत्र, हिमनद, हिमाच्छादित पर्वत, खनन या औद्योगिक वेस्टलैंड तथा अपक्षयित प्लांटेशन भूमि—all को वेस्टलैंड्स की श्रेणी में रखा गया।

#### For decades, studies have shown...

#### दशकों से, अध्ययनों ने दिखाया है...

- Far from being a wasteland, these savannah grasslands are flourishing ecosystems that not only harbour unique biodiversity but also provide livelihoods to millions of pastoral communities.  
वेस्टलैंड होने के बजाय, ये सवाना घासभूमियाँ समृद्ध पारिस्थितिक तंत्र हैं जो न केवल अद्वितीय जैव-विविधता को संजोए हुए हैं, बल्कि लाखों पशुपालक समुदायों को आजीविका भी प्रदान करती हैं।
- Take Maharashtra, for instance. The State’s livestock economy was valued at over **₹59,000 crore**, a massive **50% more** than before in **2018-2019**, and that’s just one year.  
उदाहरण के लिए महाराष्ट्र को लें। राज्य की पशुधन अर्थव्यवस्था का मूल्य **₹59,000 करोड़** से अधिक था, जो **2018-2019** में पहले की तुलना में **50% अधिक** था, और यह सिर्फ एक वर्ष का आँकड़ा है।

#### What lies beneath

#### नीचे क्या छिपा है

- Grasslands play a crucial role in building and maintaining healthy soils, primarily through their deep, fibrous root systems that stabilise the ground, enhance soil structure, and promote long-term carbon storage.  
घासभूमियाँ स्वस्थ मिट्टी के निर्माण और संरक्षण में महत्वपूर्ण भूमिका निभाती हैं, मुख्यतः अपनी गहरी, रेशेदार जड़ प्रणाली के माध्यम से जो भूमि को स्थिर करती है, मिट्टी की संरचना सुधारती है और दीर्घकालिक कार्बन भंडारण को बढ़ावा देती है।
- Unlike forests, where most biomass is above ground, grassland productivity is concentrated below ground, creating dense root mats that improve water infiltration, reduce erosion, and buffer soils against drought.  
वनों के विपरीत, जहाँ अधिकांश बायोमास जमीन के ऊपर होता है, घासभूमि की उत्पादकता मुख्यतः जमीन के नीचे केंद्रित होती है, जहाँ घनी जड़ चटाइयाँ बनती हैं जो जल अवशोषण बढ़ाती हैं, क्षरण कम करती हैं, और सूखे के विरुद्ध मिट्टी को सुरक्षित रखती हैं।
- These roots continually deposit organic matter, enriching soils with stable carbon compounds that can persist for centuries.  
ये जड़ें लगातार कार्बनिक पदार्थ जमा करती हैं, मिट्टी को स्थिर कार्बन यौगिकों से समृद्ध करती हैं जो सदियों तक बने रह सकते हैं।



- Grassland soils also support diverse microbial and fungal communities that drive nutrient cycling and maintain soil fertility.  
घासभूमि की मिट्टी विभिन्न सूक्ष्मजीवी और कवक समुदायों का भी समर्थन करती है जो पोषक पुनर्चक्रण चलाते हैं और मिट्टी की उपजाऊपन बनाए रखते हैं।
- When grasslands are degraded, converted, or afforested, these below-ground processes are disrupted, leading to compaction, erosion, loss of soil organic carbon, and reduced ecosystem resilience.  
जब घासभूमियाँ क्षरित, परिवर्तित या वनीकरण की जाती हैं, तो ये भूमिगत प्रक्रियाएँ बाधित होती हैं, जिससे सघनता, क्षरण, कार्बनिक कार्बन की कमी, और पारिस्थितिक तंत्र की लचीलापन घटता है।
- As the climate crisis worsened, the importance of carbon sequestration in ecosystems moved to the forefront of global discussions.  
जैसे-जैसे जलवायु संकट बढ़ा, पारिस्थितिक तंत्रों में कार्बन अवशोषण का महत्व वैश्विक चर्चाओं के केंद्र में आ गया।
- Research began pouring in from around the world, showing that grasslands hold enormous potential for carbon sequestration.  
दुनिया भर से शोध आने लगे, यह दर्शाते हुए कि घासभूमियों में कार्बन अवशोषण की अत्यधिक क्षमता है।
- Thus, in addition to their role as an abode of diverse wildlife and their socio-economic importance, we now know that grasslands store a huge amount of below-ground carbon, which remains undisturbed even by fire.  
इस प्रकार, विविध वन्यजीवों के आवास और सामाजिक-आर्थिक महत्व के अतिरिक्त, अब हम जानते हैं कि घासभूमियाँ भूमिगत कार्बन की विशाल मात्रा संग्रहीत करती हैं, जो आग लगने पर भी प्रभावित नहीं होती।
- A pioneering initiative in Solapur's semi-arid grasslands signalled a shift in the Maharashtra State forest department's perception of these ecosystems.  
सोलापुर की अर्ध-शुष्क घासभूमियों में एक अग्रणी पहल ने महाराष्ट्र राज्य के वन विभाग की इन पारिस्थितिक तंत्रों के प्रति धारणा में बदलाव का संकेत दिया।
- The **Compensatory Afforestation Fund Management and Planning Authority (CAMPA)** which manages funds collected for the conversion of forest land to non-forest for developmental works, decided to use a part of this for restoring degraded grasslands.  
**CAMPA (कंपेसटरी अफॉरेस्टेशन फंड मैनेजमेंट एंड प्लानिंग अथॉरिटी)**, जो विकास कार्यों हेतु वन भूमि को गैर-वन में बदलने के लिए एकत्रित फंड का प्रबंधन करती है, ने इस फंड के एक हिस्से का उपयोग **अपक्षयित घासभूमियों के पुनर्स्थापन** के लिए करने का निर्णय लिया।
- CAMPA authority of the Maharashtra forest department restored degraded patches of grassland in the Malshiras forest range of Solapur district over several years.  
महाराष्ट्र वन विभाग की **CAMPA authority** ने कई वर्षों में सोलापुर जिले के **मलशीरस वन परिक्षेत्र** में अपक्षयित घासभूमि के हिस्सों को पुनर्स्थापित किया।
- Native grasses such as *Dicanthium annulatum*, *Chrysopogon fulvus* and *Cenchrus setigerus* were raised in a nursery and then later planted in situ after the first monsoon showers.  
**Dicanthium annulatum**, **Chrysopogon fulvus** और **Cenchrus setigerus** जैसी देशज घासों को नर्सरी में उगाया गया और फिर पहली **मानसून वर्षा** के बाद स्थल पर लगाया गया।
- Subsequently, a study was conducted by researchers from Ashoka Trust for Research in Ecology and Environment, Bengaluru and The Grasslands Trust, in partnership with the forest department to understand the impacts of these restoration activities on soil, including carbon sequestration.  
इसके बाद, **Ashoka Trust for Research in Ecology and Environment (ATREE)**, Bengaluru और **The Grasslands Trust** के शोधकर्ताओं द्वारा वन विभाग के सहयोग से एक अध्ययन किया गया ताकि मिट्टी पर इन पुनर्स्थापन गतिविधियों के प्रभाव, विशेषकर **carbon sequestration**, को समझा जा सके।
- This study compared restored plots of different ages (one, two and three years) to an unrestored site, and to an undisturbed old-growth grassland.  
इस अध्ययन ने विभिन्न आयु के पुनर्स्थापित भूखंडों (एक, दो और तीन वर्ष) की तुलना एक **अपुनर्स्थापित स्थल** और एक **अविक्षुब्ध पुरानी घासभूमि** से की।
- The study revealed that the restored grasslands showed a significant increase in the soil organic carbon (SOC) at the treatment sites compared to the control sites.  
अध्ययन से पता चला कि पुनर्स्थापित घासभूमियों में **soil organic carbon (SOC)** में उपचार स्थलों पर नियंत्रण स्थलों की तुलना में **महत्वपूर्ण वृद्धि** देखी गई।



- After two years, the restored sites showed an increase of **21% SOC** compared to the untreated site, and a massive **50% greater** than the untreated by the third year.  
दो वर्षों के बाद पुनर्स्थापित स्थलों में **21% SOC** की वृद्धि देखी गई, और तीसरे वर्ष तक यह अपुनर्स्थापित स्थल की तुलना में **50% अधिक** हो गई।
- These findings highlight how grassland restoration from the CAMPA funds paves the way for India to meet its climate goals.  
ये निष्कर्ष दर्शाते हैं कि **CAMPA funds** से घासभूमि पुनर्स्थापन भारत को अपने **climate goals** हासिल करने में कैसे मदद करता है।
- Another recently published study by researchers at ATREE has documented the remarkable carbon sequestration potential of the **Banni Grassland** in the Kutch district of Gujarat.  
ATREE के शोधकर्ताओं के एक हालिया अध्ययन ने गुजरात के कच्छ जिले की **बन्नी घासभूमि** की अद्भुत **carbon sequestration** क्षमता को दर्ज किया है।
- Once celebrated as the largest tropical grassland in Asia, Banni suffered decades of policy missteps that promoted large-scale planting of the invasive mesquite (*Neltuma juliflora*).  
एक समय एशिया की सबसे बड़ी उष्णकटिबंधीय घासभूमि के रूप में प्रतिष्ठित **बन्नी** ने दशकों तक नीतिगत त्रुटियों का सामना किया, जिन्होंने **Neltuma juliflora** (आक्रामक मेस्काइट) के बड़े पैमाने पर रोपण को बढ़ावा दिया।
- This rapidly transformed vast open savannahs into dense, impenetrable thickets, degrading both ecology and pastoral livelihoods.  
इसने तेजी से विशाल खुले **savannahs** को घने, अभेद्य झाड़ियों में बदल दिया, जिससे पारिस्थितिकी और चरवाहा आजीविका दोनों प्रभावित हुईं।
- The study reveals a striking pattern: restored grassland patches, locally known as **wada**, store the highest levels of soil organic carbon (SOC), followed by wetlands and dense woodlands.  
अध्ययन एक उल्लेखनीय पैटर्न दर्शाता है: पुनर्स्थापित घासभूमि के हिस्से, जिन्हें स्थानीय रूप से **वाडा** कहा जाता है, सबसे अधिक **SOC** संग्रहीत करते हैं, इसके बाद आर्द्रभूमि और घने वुडलैंड आते हैं।
- The lowest SOC values were found in mixed woodland stands and saline grasslands.  
सबसे कम SOC मान मिश्रित वुडलैंड और लवणीय घासभूमियों में पाए गए।
- What makes Banni especially noteworthy is that these restored patches were revived by the community itself, first by removing *Prosopis* and allowing native perennial grasses to regenerate.  
बन्नी को विशेष रूप से उल्लेखनीय बनाता है कि इन पुनर्स्थापित क्षेत्रों को **समुदाय द्वारा स्वयं** पुनर्जीवित किया गया—पहले **Prosopis** को हटाकर और देशज बहुवर्षीय घासों को प्राकृतिक रूप से विकसित होने देकर।

### Carbon-rich and arid कार्बन-समृद्ध और शुष्क

- The Maldhari pastoralists manage these areas through rotational grazing, controlled harvest of standing biomass, and careful monitoring of grass recovery.  
**मालधारी** चरवाहे इन क्षेत्रों का प्रबंधन **rotational grazing**, खड़े बायोमास की नियंत्रित कटाई, और घास की पुनर्प्राप्ति की सावधानीपूर्वक निगरानी के माध्यम से करते हैं।
- Across its four major land-use types, Banni stores **27 metric tonnes of carbon up to 30 cm soil depth**, with an average SOC density of around **120 tonnes of carbon per hectare**.  
अपने चार प्रमुख भूमि उपयोग प्रकारों में, बन्नी **30 सेमी मिट्टी की गहराई तक 27 मीट्रिक टन कार्बन** संग्रहीत करता है, और औसत SOC घनत्व लगभग **120 टन कार्बन प्रति हेक्टेयर** है।
- This places Banni among the most carbon-rich arid ecosystems globally, demonstrating that healthy grasslands, not invasive trees, underpin true climate resilience in drylands.  
यह बन्नी को विश्व के सबसे कार्बन-समृद्ध शुष्क पारिस्थितिक तंत्रों में स्थान देता है, यह दर्शाते हुए कि सूखे क्षेत्रों में वास्तविक **climate resilience** का आधार आक्रामक पेड़ नहीं, बल्कि **स्वस्थ घासभूमियाँ** हैं।
- Banni also shows the way forward: restoring native grasses, removing invasive woody cover, and placing pastoralist communities at the centre of governance.  
बन्नी आगे का मार्ग भी दिखाता है: देशज घासों का पुनर्स्थापन, आक्रामक वृक्षावरण को हटाना, और चरवाहा समुदायों को शासन के केंद्र में रखना।
- Participatory, community-led grassland management is not just a restoration method—it is the restoration outcome.



सहभागी, समुदाय-नेतृत्वित घासभूमि प्रबंधन सिर्फ एक पुनर्स्थापन विधि नहीं है—यह स्वयं पुनर्स्थापन का परिणाम है।

- The Intergovernmental Panel on Climate Change reminds us that soils hold twice as much carbon as the atmosphere and all living biomass combined.

IPCC हमें याद दिलाता है कि मिट्टी में वातावरण और सभी जीवित बायोमास के संयुक्त कार्बन से दोगुना कार्बन होता है।

- In an era of rising temperatures and more frequent forest fires, the relative stability of SOC in grasslands—protected beneath the soil surface—is an advantage we urgently need to recognise.

तेज़ी से बढ़ते तापमान और अधिक बार लगने वाली **forest fires** के युग में, घासभूमियों में मिट्टी के भीतर सुरक्षित **SOC की स्थिरता** एक ऐसा लाभ है जिसे हमें शीघ्रता से पहचानना चाहिए।

- Banni and Malshiras teach us a profound lesson: our strongest climate solutions lie beneath our feet.

**बन्नी और मलशीरा** हमें एक गहरा सबक देते हैं: हमारे सबसे मजबूत जलवायु समाधान हमारे पैरों के नीचे हैं।

- The deep roots of native grasses have been storing carbon for millennia, long before the word “sequestration” entered our vocabulary.

देशज घासों की **गहरी जड़ें** सहस्राब्दियों से कार्बन संग्रहीत कर रही हैं, बहुत पहले से जब “**sequestration**” शब्द हमारी भाषा में आया भी नहीं था।

- India’s climate-resilient future will not be achieved merely by planting trees; in many places, especially in our drylands, it will come from restoring ecosystems where the soil still remembers how to breathe.

भारत का **climate-resilient future** केवल पौधे लगाने से नहीं बनेगा; कई स्थानों पर, विशेषकर शुष्क क्षेत्रों में, यह उन पारिस्थितिक तंत्रों को पुनर्जीवित करने से आएगा जहाँ मिट्टी अभी भी “साँस लेना” याद रखती है।

PATRIOTICIAS